2-9-2018 1:30 PM

The Semi-Subterranean Sweat Lodges of the Redeemer Site

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Graduate Program in Anthropology
A thesis submitted in partial fulfillment of the requirements for the degree in Master of Arts

ABSTRACT

Sweat bathing is a practice of great antiquity and is well documented throughout the world. In the archaeological record of southern Ontario, sweat bathing has been identified via a feature class referred to as semi-subterranean sweat lodges (SSLs). To add to our understanding of this feature class, this research examines the SSLs of the Redeemer site (AhGx-114), a fourteenth century Iroquoian village located in Hamilton, Ontario. Statistical analyses were applied to SSL data, aimed at identifying whether any significant patterns emerged regarding spatial and morphological attributes, and artifact distributions. Broader societal changes during the Middle Ontario Iroquoian period were also explored through inter-site analyses focused on SSLs. The results indicate sweat bathing was an important part of the Redeemer community's collective experience, seen in the frequency of SSLs at the site, the standardization of construction methods, and in the deposition of artifacts of significance, together signifying a strong community of practice. This community of practice is not limited to Redeemer, as is demonstrated through an in-depth examination of 18 sites across southern Ontario.

KEYWORDS

Archaeology, Ontario, Iroquoian, Middle Ontario Iroquoian, Uren, Village, Redeemer Site, AhGx-114, Semi-Subterranean Sweat Lodges, Turtle Pits, Keyhole Features, Sweat Bathing

ACKNOWLEDGMENTS

Thank you to Philip Woodley for the inspiration and access to the Redeemer site data, to Peter Timmins for the guidance, and to my husband James, for all your love, support, and encouragement. I couldn’t have done it without you.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF MAPS

LIST OF IMAGES

LIST OF APPENDICES

LIST OF FIGURES

1.0 INTRODUCTION

Sweat bathing is a practice of great antiquity and is well documented throughout the world. It served multiple functions such as personal cleansing, ritual practices, and increasing social integration. It is only in the last few decades that sweat bathing has been documented in the archaeological record of southern Ontario, with the identification of a specific feature class commonly referred to in the literature as 'turtle pits,' 'semi-subterranean sweat lodges (SSLs),' or 'keyhole structures.' This feature class appears in the archaeological record at the end of the thirteenth century, a time marked by significant cultural changes such as community aggregation into larger village organizations. To date, most research on SSLs has been limited to discussions of their function (Smith 1976; MacDonald 1988; Bursey 2001; MacDonald and Williamson 2001), with a secondary focus on how the structures contribute to our understanding of community practice.

A recent excavation of a Middle Ontario Iroquoian village provides a unique opportunity to explore the place and function of sweat bathing in the early fourteenth century (Woodley 2008; 2012). The Redeemer site (AhGx-114) is located at the top of the Niagara escarpment in the City of Hamilton and is described as a Uren substage Iroquoian village dating to the first quarter of the fourteenth century. Excavations were completed between 2005 and 2009 and revealed a fascinating village layout. Five confirmed longhouses were documented surrounded by a palisade wall, and an additional four possible longhouses were also identified. Redeemer is unique in that 36 SSLs were encountered across the site, which represented a high ratio of houses-to-SSLs not previously documented in southern Ontario.

Few in-depth SSL investigations have been completed to date, with previous studies having focused on providing general descriptions of how SSLs were constructed and presenting hypotheses regarding the role of sweat bathing in Iroquoian societies (Tyyska 2015; MacDonald 1988; Williamson et al. 1998; MacDonald and Williamson 2001). The current research seeks to provide alternative methods by which SSLs may be analyzed. In addition to providing qualitative descriptions of the Redeemer SSLs, statistical analyses are applied to quantitative data to identify whether any significant patterns emerged regarding SSL spatial and morphological attributes, and artifact distributions. It is hoped that the results of these analyses can act as an interpretative gateway by which broader community patterns can be identified.

Consequently, the focus of this research is threefold: 1) to investigate trends in SSL construction, use, and disuse at Redeemer; 2) to examine the fluorescence of SSLs at Redeemer as a lens through which to understand Redeemer's social, political, and built environments; and, 3) to explore broader societal changes during the Middle Ontario Iroquoian period through inter-site analyses focused on SSLs. Specifically, this research provides comparative and statistical analyses of all 36 sweat lodge features related to placement, orientation, construction method, infill, and artifact deposition. Inter-site analyses are then completed, aimed at identifying whether any temporal or regional variability in SSL location, alignment, and dimensional attributes are present. Finally, a broader discussion is presented on the socio-political and built environment of the Redeemer site, and how in-depth analyses of SSLs can provide a window into the lived experiences of past Iroquoian communities.

1.1 Chapter Summary

A summary of the chapter structure of this thesis is presented below.

Chapter 2.0 provides an overview of the Early Late Woodland, and the Early and Middle Ontario Iroquoian periods. It offers a summary of the changes in settlement and subsistence patterns, material culture, and socio-political lifeways during these times, discusses sweat bathing practices as related to shamanism and ritual practice, and concludes with a history of sweat bathing throughout the Ontario archaeological record. Additionally, Chapter 2 situates the Redeemer site within its environmental context and provides a summary of the previous archaeological investigations. Data from the two Stage 4 excavations are amalgamated to present a summary report of the intra-site settlement patterns and material culture encountered at Redeemer.

Chapter 3.0 presents the research methods. SSL attributes that were isolated for analyses are described including spatial, morphological, and artifact distribution data. A summary and rationale for the statistical tests that were applied is also provided. Finally, the methods used for inter-site analyses are discussed, which include how sites were chosen, and the SSL spatial and morphological attributes that were considered for comparative study.

Chapter 4.0 provides the results of this research. Detailed descriptions of each SSL are provided, including dimensional data, construction methods, basal layers, infill, alignment, and presence/absence of perimeter posts. Following textual descriptions, results are presented on the analyses completed for SSL spatial and morphological attributes, as well as artifact distributions.

Chapter 5.0 explores the inter-site comparisons completed for this research. Summaries of the selected sites are provided, followed by the results of the analyses. Variables considered for the inter-site analyses included SSL location, alignment, and dimensional attributes. Temporal and regional variability is also explored.

Chapter 6.0 provides a discussion of results and presents conclusions. A review of the identified spatial and morphological trends is provided along with a summary of all patterns that emerged regarding artifact distributions. The results are then used to explore the social, political, and built environment of the Redeemer community. Temporal and regional variation in southern Ontario's SSLs is examined, along with a more specific case study of one Simcoe County community complex explored through this research. The Redeemer site is then situated within its regional archaeological context, and future lines of inquiry for SSL research are highlighted.

2.0 BACKGROUND

2.1 Early Late Woodland (A.D. 500-1000)

As Warrick (2000) noted, the term 'Iroquoian' denotes both a language and a cultural group. In southern Ontario, the Iroquoians first appear in the archaeological record at around A.D. 500. These Early Late Woodland peoples were recognized by the appearance of Princess Point sites along the Grand River, the adoption of maize horticulture, and the presence of a ceramic tradition using slab/paddle and anvil technology with significant cording on ceramic vessels (Williamson 1990; Warrick 2000). Princess Point communities lived in small houses that averaged 5 m in length and 3 m in width (Smith and Crawford 1997) and practiced semi-permanent settlement-subsistence with year-round macroband settlements on river floodplains and special purpose camps in the interior (Williamson 1990; Warrick 2000). Socio-political lifeways are more difficult to determine for this period. Warrick (1990) suggested that by A.D. 900, approximately 2000 individuals were living in the Grand River Valley. Kapches (1990) argued that matrilocal residence systems were lacking within Princess Point communities, with house floor areas being too small to support such a system. Thus, it seems likely that Princess Point community organization fell somewhere between the patrilocal Middle Woodland peoples and the developing matrilocal, matrilineal Early Iroquoians (Braun 2015:17).

Following significant archaeological investigations across southern Ontario, most archaeologists have accepted an in-situ development of northern Iroquoians in southern Ontario beginning around A.D. 500. However, some archaeologists (e.g. Snow 1995, 1996) have questioned the in-situ hypothesis and have instead suggested a migration hypothesis to explain the appearance of Iroquoians in southern Ontario. Proponents of the migration model, such as Snow (1995, 1996), hypothesized that Iroquoians came to southern Ontario and displaced or absorbed Middle Woodland populations. According to this theory, the migrants brought with them the cultural traits seen in the Ontario Iroquoian Tradition including maize agriculture, longhouse villages with palisades, and matrilocal/matrilineal societal practices. In contrast, research in the last few decades has demonstrated continuity from the Middle Woodland to the Princess Point and Early Ontario Iroquoian populations based on similar settlement characteristics and ceramic elements (Fox 1990; Warrick 2000; Curtis 2014).

2.2 Early Ontario Iroquoian Period (AD 900-1300)

The transition to Early Iroquoian lifeways seems to have been a gradual process (Warrick 2000). Early Iroquoian times were marked by the appearance of the first nucleated settlements in southern Ontario that were likely occupied by between 75 and 200 individuals (Williamson 1990). Increased sedentism and more intensive maize horticulture were evident, and most sites were now located on well-drained uplands with easily cultivated, sandy soils rather than on river floodplains (Warrick 2000). Population estimates for south-central Ontario during this time suggested an increase from 2000 to 8000 individuals between A.D. 900 and 1300 (Warrick 1990). Material culture was dominated by well-made and thin walled ceramic vessels with extensive and highly variable decorative motifs and techniques (Williamson 1990). Also included within the Early Ontario Iroquoian assemblage were smoking pipes, ceramic gaming discs, chipped stone tools and debitage, and bone, antler, shell, and native copper artifacts (Williamson 1990).

Early Iroquoian villages averaged 0.4 hectares in size (Warrick 2000) and had a palisade wall or fence that appeared as one or two rows surrounding several house structures that were randomly-oriented and often overlapping (Williamson 1990). Several researchers have suggested that the insubstantial palisades or fences likely served symbolic rather than defensive purposes (Englebrecht 2009), with walls delineating who belonged from who did not (Ferris 2003). The house structures averaged 10 m to 20 m in length (Dodd 1984). While the overlapping nature of the structures seen in these settlements was originally interpreted as poor village planning, more recent studies on the Calvert site (Timmins 1997) and other sites have demonstrated successive phases of occupation and reoccupation, possibly by the same community over several generations (Williamson 1990; Timmins 1997). Birch (2015) has suggested these settlements might be characterized as ‘persistent places.’

During the Early Iroquoian period, an increasing organization of domestic space becomes visible in the archaeological record (Birch 2015). Centrally located hearths and deep storage pits were present within the house structures (Warrick 2000). Crease (2012) posited that the centrally located hearths could be an early indication of the bilateral symmetry seen in Iroquoian settlements in which two families located on either side of a longhouse shared a hearth. The increasing appearance of household and village organization correlated with a growing interest in long term settlement seen through year-round residence. Increased organization was apparent in the clustering of Early Iroquoian sites, including larger semi-permanent settlements, seasonal camps

and resource extraction areas (Williamson 1990). Together, these settlement clusters have been understood as contemporary communities that shared a hunting area (Timmins 1997).

Crease (2013) has suggested that the trend towards permanent village life would have likely required processes of 'place making' to create and strengthen the stability of co-residential groups. Birch (2015) agreed suggesting that the creation and maintenance of social boundaries was therefore likely significant in the ongoing development of community identities within a territory. The increased permanency appeared to be entwined with a reconfiguration of social identity (Braun 2015), which was suggested by the larger house structures that were long-term, multi-family dwellings. Communal activities within the structure, at least symbolically, could act to strengthen intra-house bonds (Braun 2015) in the same way that interactions within a settlement would strengthen the ties between village occupants. The emergence of matrilocal residency practices was also seen during this time and could have arisen in response to investments into maize horticulture, more permanent year-round settlements, and population growth (Williamson 1990). As Birch and Williamson (2013) noted, the increased investment by Early Iroquoians in their villages and clusters of communities likely led to increasing concern with the ways in which physical, social, and territorial boundaries were maintained. Timmins (1997) has further suggested that Early Iroquoian communities may have been governed by a village council of matrilineages, with each matrilineage contained within a longhouse.

2.3 Middle Ontario Iroquoian Period (AD 1300 to 1420)

The turn of the fourteenth century saw significant changes in Iroquoian lifeways including the development of large, semi-permanent villages, a fully developed horticultural system, new socially-integrative institutions, and a relatively homogeneous material culture (Birch and Williamson 2013). While original interpretations of Middle Iroquoian life suggested this was a time of cultural homogenization (Wright 1966; Dodd, Poulton, Lennox, Smith and Warrick 1990), more recent research has demonstrated there was significant variability among communities (Williamson and Robertson 1994). Population growth in southern Ontario during this period was rapid and widespread, increasing from around 10,000 individuals at the turn of the century to approximately 24,000 persons by A.D. 1420 (Warrick 1990). While increased populations and improved social and economic networks undoubtedly served to strengthen regional interaction, it

is clear Iroquoian communities underwent a series of transformations in different forms and at different times across southern Ontario (Birch and Williamson 2013).

Rapid and widespread population growth influenced the ways in which community development and cultural practices emerged. There were likely two primary methods for coping with increased population size: 1) community fission, in which populations moved into unoccupied territories, and; 2) community amalgamation, in which two or more community clusters joined to form a larger village (Warrick 2000; Birch and Williamson 2013). Where community amalgamation occurred, village size during the fourteenth century increased up to 1.5 hectares in size, nearly double that of Early Iroquoian times (Warrick 1990). The newly formed villages were likely comprised of the same communities that formed regional site clusters during the Early Iroquoian period (Timmins 1997; Birch and Williamson 2013).

Such a shift undoubtedly led to changes in sociopolitical and economic organization within and between newly formed communities (Braun 2015). The consolidation of two or more Early Iroquoian communities would have resulted in village sizes of approximately 400 to 600 individuals (Crease 2011) and would have required an increased level of organization within the village. During this period, longhouses appeared more ordered, with one or two clusters of similarly aligned houses frequently observed in villages. Likewise, interior longhouse configuration was more patterned, with the presence of centrally located hearths and the appearance of side platforms, support posts, storage pits under platforms, and entrances and storage cubicles at house ends (Dodd 1984; Creese 2011). House length also increased to an average of 28 to 38 m in length (Crease 2011), nearly double that of the Early Iroquoian period, which may "reflect the increased importance of the social, economic, and political unit formed by a co-residential household group" (Birch and Williamson 2013: 20). Englebrecht (2003) has suggested that the longest longhouses may have been inhabited by chiefs, used to hold political meetings or ceremonies, or used as ritual space analogous to a ceremonial square elsewhere in the world.

New sociopolitical mechanisms also developed during this time, likely to cope with changes in lifeways associated with community amalgamation, population growth, increased resource pressure, and occupation of semi-permanent villages. Problems inherent with shared decision making, social integration, and conflict resolution would have been heightened in these newly formed communities (Birch 2015). Birch and Williamson (2013) cited the appearance of

formal matrilineages, the beginnings of clan organization, ossuary burial, and the appearance of SSLs as mechanisms for integration and ordering of social groups within and between communities. Regarding SSLs, the frequency with which they appeared from the turn of the fourteenth century onward suggests they provided an important role in community life (Birch and Williamson 2013).

Historically, the Middle Ontario Iroquoian tradition has been divided into two substages: the Uren substage (*ca.* 1300 to 1330) and the Middleport substage (*ca.* 1330 to 1420) (Dodd et al. 1990). Archaeologically, these substages are differentiated primarily through an analysis of material culture. The Uren substage is identified by ceramic vessel assemblages with a higher percentage of push-pull, or linear stamping techniques seen on the upper rims of pots, while the Middleport substage has a higher prevalence of incised linear motifs (Wright 1966; Dodd et al. 1990). Middleport sites also have larger and more complex smoking pipe assemblages. Such identifications can assist in determining whether a settlement was occupied earlier or later in the Middle Iroquoian period, although regional variation exists.

2.4 Sweat Lodges and Ritual Practice

The evidence for sweat bathing in southern Ontario Iroquoian populations is based on ethnographic evidence from early explorers and missionaries and archaeological research, and is underlain by theories of shamanistic and ritual practices. The following section discusses these topics and provides a preliminary discussion regarding the potential roles that sweat bathing played in Iroquoian communities.

2.4.1 Ethnohistorical Evidence for Sweat Bathing

In southern Ontario, early accounts of sweat bathing appeared in the seventeenth century and were described in detail by early explorers and missionaries such as Gabriel Sagard (Tooker 1964; Trigger 1990). In her *Ethnography of the Huron*, Tooker (1964) reviewed several early sources, including but not limited to the writings of Gabriel Sagard and the *Jesuit Relations*, and at several points refers to sweat lodges and the practice of sweat bathing at the time of contact. For example, Sagard observed that hot rooms and sweat bathing were used for curing of natural illnesses in concert with natural remedies. Sagard also noted that men would participate in sweat bathing to remain in good health and to prevent disease. Sweat bathing was also used by medicine

men to identify the cause and cure for an illness, predict success in war, invoke assistance and advice from the spirits, and make remedies more successful (as cited by Tooker 1964).

Sweats were often conducted with multiple individuals, at any point when an individual felt the need to sweat bathe (Tooker 1964). Above ground sweat lodges were constructed on demand rather than being permanent structures (Tooker 1964). Stones were heated in a large fire and then transported to a pile at the location of the sweat (Tooker 1964). Posts were positioned around the pile of hot stones and were bent to meet at the top (Tooker 1964). Sweat lodge heights have been referenced as ranging from 90 to 120 cm (Tooker 1964). Once the men were inside, others would cover the posts with large pieces of bark and skins so that heat could not escape (Tooker 1964). The men inside the sweat lodge were positioned closely, with their knees drawn up to their stomach, and one or more men would sing while the others continuously chanted (Tooker 1964). Tobacco was occasionally burned or smoked, and occasionally fasting was required prior to the sweat (Tooker 1964).

2.4.2 Shamanism and Ritual Practice

Considering that contact period sweat bathing among the Huron occasionally involved commune with the ancestors, some level of spirituality was likely associated with the practice. While it has not been suggested that sweat bathing during the Early and Middle Iroquoian times was always focused on spiritual experience, it seems plausible that sweat bathing held some ritual associations. Further, if parallels can be drawn between contact period sweat bathing and sweat bathing in earlier times, then it can be posited that similar functions, such as achieving altered states of consciousness to interact with the spirits, were also relevant prior to contact.

Von Gernet (1992, 1995) has suggested that the fundamental features of Native religion in the Americas developed from the PalaeoIndians who came to the area with a circumpolar belief system. Fox and Salzer (1999) have argued that one of the more common expressions of this system in hunter-gatherer populations was shamanism, an individualistic religious practice that stemmed from the uncertainties inherent in a hunting and gathering society.

In contemporary anthropological study, broader definitions of shamanism have been posed that describe a belief system that involves contact or communication with supernatural beings via altered states of consciousness and with culturally accepted rituals and objects (VanPool 2009). Braun (2015), based on VanPool (2009), defined shamanism as a social/ritual system in which some or all members of a community met their subsistence, social and religious needs by directly

interacting with the spirit world. In this way, shamanism was viewed as a group effort to ensure the social, physical and spiritual survival of the community (Braun 2015). That it is both a group effort and an individualistic experience demonstrated that while certain individuals or shamans could be predisposed towards gaining knowledge through interactions with the spirits, shamanistic practice was not restricted to shamans. Instead, shamanism could be viewed as collective knowledge shared by a community in which certain individuals may hold more knowledge than others (Fox and Salzer 1999).

It has been posited that shamanism and ritual practice were likely intertwined with the very nature of sweat bathing, as has been documented elsewhere in the circumpolar region and with the Huron at the time of contact (Lopatin 1960; MacDonald 1988). That sweat bathing in Iroquoian societies served a similar function is supported by the recovery of artifacts imbued with ritual or spiritual significance from the basal layer of some sweat lodge features.

Braun (2015) noted that ritual practices focused on the goal of communing with the ancestors via altered states of consciousness involved a spiritual intention. There were many methods to attain an altered state of consciousness. Von Gernet (1995) has suggested that in Northeast America, people smoked a variety of mind-altering plants, likely to enter altered states of consciousness. Several native plant species could have had this effect, including *Nicotiana rustica* (native tobacco), which could have been consumed in a quantity sufficient to cause sensations of flight or out-of-body experiences (von Gernet 1995; von Gernet and Timmins 1987). Fasting, chanting, and sweat bathing could also produce trance-like states by means of low blood sugar, dehydration, sensory deprivation, and overstimulation of senses (MacDonald 1988; Vanpool 2009). Based on accounts by early missionaries and explorers (as cited in Tooker 1964), sweat bathing practices at the time of contact often involved one or more of these methods to achieve altered states of consciousness.

2.4.3 Archaeological Research

In 1972, Tyyska (2015) was the first to infer the existence of sweat lodge features in the archaeological record of southern Ontario, citing as evidence the presence of post clusters along the central corridor of Iroquoian longhouses. Tyyska provided a discussion on the possible identification of the above-ground sweat lodges that were so frequently observed by early European explorers and missionaries at Huron villages. While some researchers have cited the presence of these above-ground structures in the published and grey literature following Tyyska's

paper (e.g. Finlayson 1985; Robertson, Monckton and Williamson 1995; Williams-Shuker 1997; MacDonald and Williamson 2001; Braun 2015), such identifications are not consistent among archaeologists in southern Ontario.

Tyyska's hypothesis was expanded upon in the late 1980s when MacDonald (1988) stimulated debate about the function of semi-subterranean keyhole shaped features, which he believed to be a sweat lodge form that was distinct from the surface sweat lodges inferred by Tyyska. The debate regarding function seemed to hinge on the paradigm of positivist thought and inference, in which several researchers suggested that there was a lack of empirical evidence to support the hypothesis that the keyhole features functioned as sweat lodges (Fitzgerald 1991; Stopp 1989). In fact, some researchers asserted that keyhole features might have served as cold storage rather than sweat lodges, the contents of which were controlled by specific families within a longhouse (Bursey 1989, 2001; Fitzgerald 1991; Stopp 1989).

Research into semi-subterranean, keyhole shaped features identified in regions outside of southern Ontario have presented similar arguments and debates (Dragoo 1977; MacDonald 2008). For example, following his archaeological investigations in the Upper Ohio Valley, Dragoo (1977) identified semi-subterranean pits at the Kinzua site (36 Wa 53) which dated to the early Late Prehistoric period (A.D. 1100-1300). Along with his research partner Stanley Lantz, they remarked that the pit was turtle shaped in plan view, measured 6 to 8 ft in length and 12 to 24 in in depth, and consisted of an ovate to rounded square chamber with a sloping, lobate entranceway. These features also contained a series of post moulds along the interior margin of the pit. While Dragoo noted that these 'turtle pits' likely served a storage function given their frequency on sites, he also indicated that some researchers have suggested that they may have acted as sweat houses. Similar research based in the Upper Susquehenna River Valley (MacDonald 2008) demonstrated that keyhole structures in the region might have also been utilized for food storage, though this supposition does not preclude other functions.

It seems less likely that a storage function was commonly used in southern Ontario. While Bursey (2001) argued that SSLs could have served as cold storage, he suggested that a complete encircling of the pit with posts would have been unnecessary. Given that perimeter posts are frequently cited attributes of SSLs in southern Ontario, Bursey's (2001) hypothesis is called into question. Braun (2015) noted that, while it is possible SSLs were multi-functional, many of their attributes would have made them unsuitable for storing food over more commonly cited storage

methods, such as simple lined pits, bark casks or containers, and suspension using the rafters of the house. Braun (2015) cited expediency as his main argument; namely, given the possibility of rodent and insect infestations, moving food stores quickly and easily would have been an important consideration to the Iroquoians. SSLs, with their significant depths and superstructures, would have been much harder to relocate and rebuild, particularly when appended to a longhouse wall.

Over the last decade, most researchers have come to accept that SSLs served primarily as sweat lodges in southern Ontario (MacDonald and Williamson 2001; Birch 2015; Braun 2015). The ubiquity of semi-subterranean sweat lodge use throughout the circumpolar region, the documented use of sweat lodges by the Huron at the time of contact, and the existence of above-ground sweat lodges inside longhouses in the historic period have all been cited as evidence for the primary use of these structures for sweat bathing (MacDonald and Williamson 2001). This argument is further supported by that fact that above-ground contact period sweat lodges were the only interior structures regularly built within the longhouse, assuming the contact period sweat lodges were a later iteration of the SSL features seen in the archaeological record.

Researchers have now provided baseline descriptions regarding the placement and construction of semi-subterranean sweat lodge features (MacDonald 1992; MacDonald and Williamson 2001; Braun 2015). Regarding location, sweat lodges were often found in three distinct places within a village plan: 1) along the central corridor of longhouses, usually oriented along the long axis of the house; 2) along the bunk lines of longhouse, also usually oriented along the long axis of the house; and 3) appended to the longhouse, oriented perpendicular to the long axis of the house, with the entranceway from the inside the longhouse. Warrick (1988) noted that sweat lodges were most often found in the longest longhouse in a village, which would have also been the most likely location for feasting and other ritual events. Construction methods appeared to be relatively standardized throughout the fourteenth and fifteenth centuries. Morphologically, sweat lodge features had a keyhole or turtle shape consisting of a large rectangular or ovate flat-bottomed pit with a small ramped entranceway. In an examination of over 70 sweat lodge features, MacDonald (1992) calculated the mean dimensions of the structures, noting an average length of 297 cm, an average width of 173 cm, and an average depth of 46 cm.

Additional attributes of sweat lodges included the presence of post moulds around the interior perimeter of the pit, the presence of a basal layer (living floor) composed of dark black soil and mottled with charcoal and ash, and two primary depositional layers above the basal layer

(MacDonald 1992). The lower depositional layer generally consisted of subsoil and fire cracked rock while the upper layer was comprised of dark organic soil intermixed with artifacts, the latter of which was interpreted to be household refuse deposited following the disuse of the sweat lodge (MacDonald and Williamson 2001). The perimeter posts are believed to have formed a superstructure over the pit and likely provided support for a bark, grass, or skin covering that may have been woven between the posts. It has been posited that, similar to longhouses, post density could indicate length of use where higher frequencies of posts indicate multiple rebuilding episodes thought to reflect structure maintenance (MacDonald and Williamson 2001).

Interestingly, artifacts of possible symbolic significance were commonly found at or near the interface of the basal layer and the lower fill layer. Pipes, turtle shell, bear skulls, carved bone items, and occasionally burials have been recovered from sweat lodge features (MacDonald and Williamson 2001). Studies of ritual deposition of symbolic artifacts on Iroquoian sites have not been widely published. One recent study completed by Braun (2015) involved the examination of Iroquoian ceramics recovered from the early fourteenth century Holly site (BcGw-58). Braun identified the deliberate breakage and patterned deposition of smoking pipes, as well as other objects seen as spiritually powerful, within the sweat lodges of the Holly site. Braun's focus on materiality, memory, and ritual within a Middle Iroquoian community suggested that some objects were placed with purpose within the sweat lodge following its disuse.

Research into the development of the Iroquoian village in southern Ontario was recently completed by Creese (2011) and included some discussion on the appearance of SSLs in the archaeological record. Creese looked at 25 sites spanning the Early to Initial Late Iroquoian periods, and which together comprised 161 houses (the unit of focus for his research). The houses were divided amongst the time periods, with the sample sizes being 62, 64, and 35, respectively. The results demonstrated that of the sample, only a single site dating to the Early Iroquoian period contained an SSL, being one house at the Praying Mantis site (AfHi-178). SSLs were present within 53% of Middle Iroquoian houses and 69% of Initial Late Iroquoian houses. Creese also examined the distribution of SSLs by house area and estimated hearth number and found that neither house area nor hearth number correlated with the number of SSLs present in a house.

Few published studies have been completed that focus on the types of information that can be gained from an in-depth analysis of SSLs on Iroquoian sites. Notable exceptions to this dearth of analyses include research on the Myers Road site (AiHb-13) (Williamson 1998) and the Hubbert

site (BbGw-9) (MacDonald and Williamson 2001). The Myers Road site is roughly contemporaneous with Redeemer, being occupied from around A.D. 1280 to 1330-1360. Ten longhouses were documented, six of which contained SSLs. Eighteen SSLs were identified in total. The excavation of these features provided a strong basis for the descriptions of placement and construction methods noted above, and that are now understood to be the basic attributes of SSLs. Likewise, the Hubbert site (mid-to-late fifteenth century) had a significant number of SSLs present on the excavated portion of the site (MacDonald and Williamson 2001). Two complete longhouses and part of a third were documented along with 17 SSLs, a comparatively high ratio when compared with other similar sites in southern Ontario.

Grey literature documenting the presence of sweat lodges in southern Ontario appears to be more prevalent, with excavations of the Alexandra site (AkGt-53) (ASI 2008a), Antrex site (AjGv-38) (ASI 2010a), Baker site (AkGu-15) (ASI 2006b), Dunsmore site (BcGw-10) (ASI 1996), Dykstra site (BbGw-5) (ASI 2006a), Olmstead site (AhGx-32) (ASI 1994), Orion site (AlGu-45) (ASI 2008b), Serena site (AhGx-274) (ASI 2004) and the Wiacek site (BcGw-26) (Lennox, Dodd, and Murphy 1986; Robertson et al. 1995), all providing comparative data for Redeemer. A review of SSL frequency, placement, construction, and infill from a variety of sites is completed as part of this study, which will aid in the determination of whether temporal or regional variability exists. The wealth of data unearthed by the Redeemer site excavation provides an excellent opportunity to conduct a detailed examination of SSLs, village settlement history, and the practice of sweat bathing from a time when sweat lodges were becoming commonplace in southern Ontario. Inter- and intra-site analyses of these sweat lodge features will provide valuable interpretative data that enables greater understanding of the cultural evolution of Middle Iroquoian populations.

2.4.4 Sweat Bathing and Semi-Subterranean Sweat Lodges

The rapid and widespread appearance of SSLs in the fourteenth century has now been well documented in southern Ontario. Researchers have begun to explore the significance of sweat lodges in relation to concurrent socio-political changes involving village growth, the amalgamation of communities, and the changes in material culture (Kapches 1995; MacDonald and Williamson 2001; Birch 2015; Braun 2015). Many of the theories put forward by researchers hinged on examinations of the processes that were occurring between the Early and Middle Iroquoian periods. This was a period of significant change. For one, populations were expanding

exponentially, increasing from an estimated 10,000 to 24,000 people in southern Ontario (Warrick 2000). Due to this population growth, residents experienced an increased pressure on resources, particularly deer, and increasingly relied on maize agriculture as a main food staple. At the same time, small communities were amalgamating into villages of multiple families, occupied year-round, and a transition from patrilineal to matrilineal, matrilocal society was occurring.

These changes occurred throughout much of southern Ontario and would have undoubtedly caused new pressures for the residents of the newly formed villages. Social tensions would have arisen due to resource pressures, shared decision making, and the move to a matrilineal society. Birch (2015) posited that community amalgamation likely led to the emergence of cultural practices that supported social interaction and integration, citing the emergence of sweat bathing via SSLs, communal ossuary burials, the proliferation of an elaborate smoking pipe complex, and the homogenization of cultural material across southern Ontario as integrative practices. Regarding sweat bathing, several researchers have suggested that communal male sweat bathing may have increased in importance during the Middle Ontario Iroquoian period as matrilocal and matrilineal societies were becoming fully developed, allowing for men of different lineages to meet together and strengthen bonds (Kapches 1995; MacDonald and Williamson 2001). Sweat lodges may have provided the venue for men to host village kinsmen and others, such as Algonkian trading and hunting partners, to reinforce relationships in both internal and external social networks.

2.5 The Redeemer Site

This section offers a summary of the investigations and results of the excavations of the Redeemer site (AhGx-114). Specifically, the summary includes reviews of the environmental conditions of the area (Section 2.5.1), the previous archaeological investigations of the site (Section 2.5.2), its settlement patterns (Section 2.5.3), and its artifact assemblage (Section 2.5.4).

2.5.1 Environment

The Redeemer site is located north of Garner Road and east of Kitty Murray Lane in the City of Hamilton. The site lies within the Great Lakes–St. Lawrence forest, which is dominated by hardwoods, featuring species such as maple, oak, yellow birch, and white and red pine (MNRF 2016). Coniferous trees, such as white pine, red pine, hemlock, and white cedar, commonly mix with deciduous broad-leaved species, such as yellow birch, sugar and red maples, basswood, and red oak (MNRF 2016). In terms of physiography, the site is found within the Haldimand Clay

Plain, a physiographic region which covers the Niagara Peninsula up to the edge of the Niagara Escarpment (Chapman and Putnam 1984).

More specifically, the site is found on a plateau that overlooks Tiffany Creek and has a clear view across the Dundas Valley to the north. The soils within the site consist of a sandy silt with abundant weathered and rounded pebbles and cobbles (Woodley 2008; 2012). These soils are part of a thin strip of alluvial sediments laterally deposited by the early glacial river that carved the Dundas Valley. The general topography is gently undulating, with the highest point of the site located to the east and south and elevations dropping to the west and north. The location would have been ideal for village settlement and conducive to corn agriculture, gathering of local plants and berries, and both fishing and hunting. Recovery of floral and faunal remains supports this analysis. However, the site itself has seen twentieth century disturbances. Specifically, a paved access road to Redeemer University College bisects the site and has caused significant damage through its centre.

2.5.2 History of Excavations

The Redeemer site was initially identified in 1987 by Art Howey, a local avocational archaeologist (Howey 1997). In 1999, archaeological consulting firm New Directions Archaeology Ltd. was contracted by Redeemer University College to conduct an archaeological assessment in advance of development at the location of the previously identified site. Stages 1-4 archaeological assessments were undertaken between 1999 and 2009, eventually revealing the entire extent of the site, which measured approximately 1.0 hectare except for the disturbed lands. Due to the presence of the road, excavations were split between those conducted on the south side of the road, and those on the north side. Table 1 displays the history of investigations at the Redeemer site.

Table 1: History of Investigations at the Redeemer site

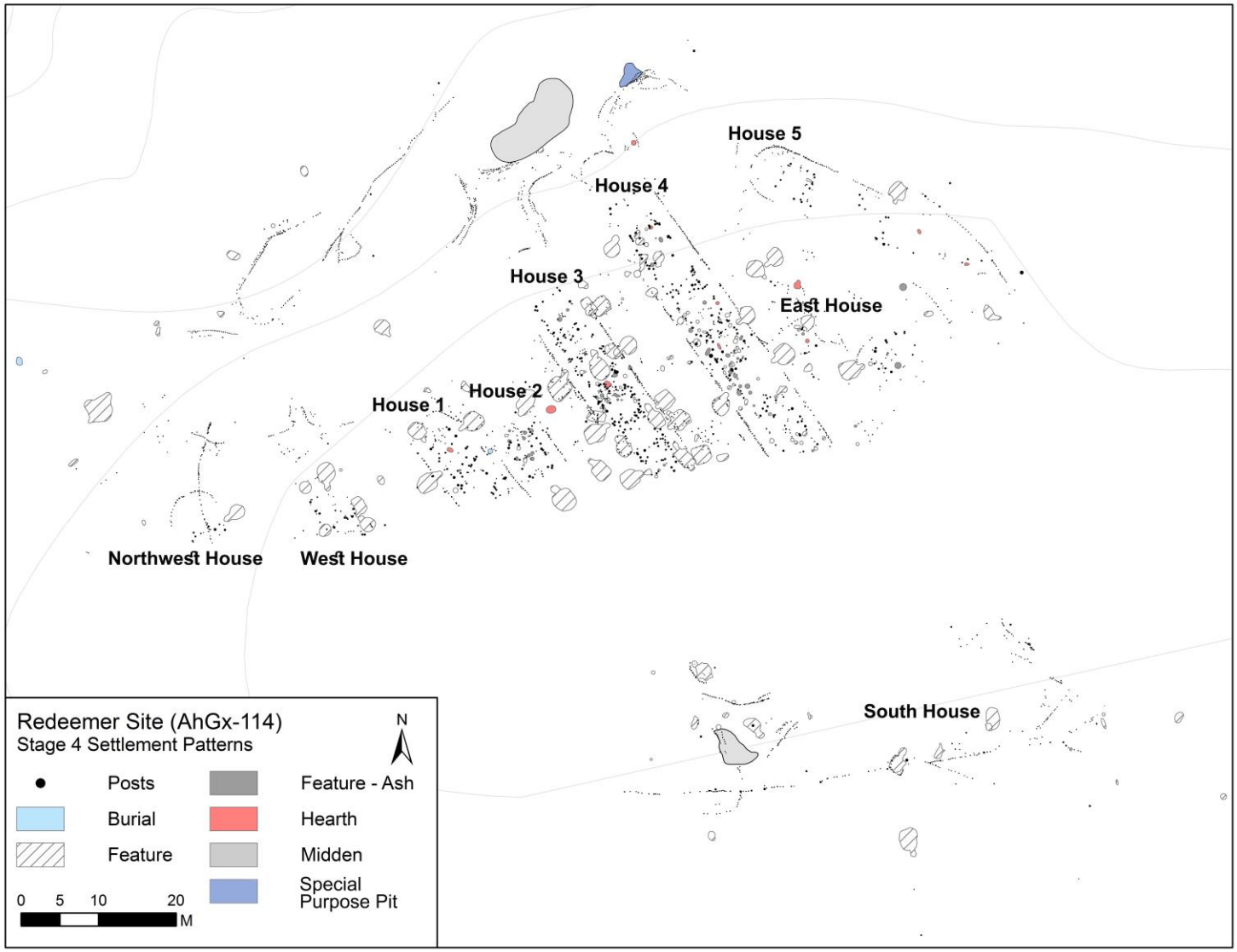
Year	Stage	Location	Reference	License #	Activities
1987-1997	n/a	n/a	Howey 1997	n/a	Collection, monitoring
1999	1-2, partial 3	South side	Woodley 2002	P018-059-029	Pedestrian survey, CSP
1999	1-2, partial 3	North side	Woodley 2001	P018-025-05	Pedestrian survey, CSP, unit excavation
2001	1-2, partial 3	North side	Woodley 2001	2001-008-07	Pedestrian survey, CSP
2002?	1-2, partial 3	South side	Woodley 2002	2002-059	Pedestrian survey, CSP
2005	Stage 3	South side	Woodley 2005	P018-127	41 1m^2 units
2005-2006	Stage 4	South side	Woodley 2008	P018-136-2005/ P018-166-2006	Mechanical excavation, feature excavation
2007	Stage 3	North side	Woodley 2007	P018-207	75 1m^2 units
2008-2009	Stage 4	North side	Woodley 2012	P018-240-2008/ P018-286-2009	Mechanical excavation, feature excavation

2.5.3 Settlement Patterns

The following presents a summary of the settlement patterns of the Redeemer site based on the Stage 4 excavations completed in 2005/2006 (Woodley 2008) and 2008/2009 (Woodley 2012). As noted, the settlement patterns at Redeemer resulted in the identification of five confirmed longhouses, four additional possible longhouses, a palisade wall or fence, and a myriad of other features associated with the settlement of the site including middens, hearths, storage/refuse pits, ash pits, and SSLs (Map 2). Table 2 displays the frequency of cultural features by location. Descriptions of the houses, middens, and the special purpose pit follow. An in-depth description of the SSLs is provided in Section 4.0.

Table 2: Summary of Features by Location

Association/ Location	Ash Pit	Hearth	Refuse/ Storage Pit	SSL	Other	Non-Cultural	Total
House 1	1	1	1	3			6
House 2	8		6	2		1	17
House 3	13	1	18	13	1	1	47
House 4	18	3	44	4	6	3	78
House 5		2	1	1			4
Northwest House				1			1
West House			4	2		1	7
East House	2	2	4	3			11
South House				3		1	4
Exterior House	2	3	27	4	4	29	69
Palisade			2		4		6
Exterior Palisade			8			1	9
Total	**44**	**12**	**115**	**36**	**15**	**37**	**259**



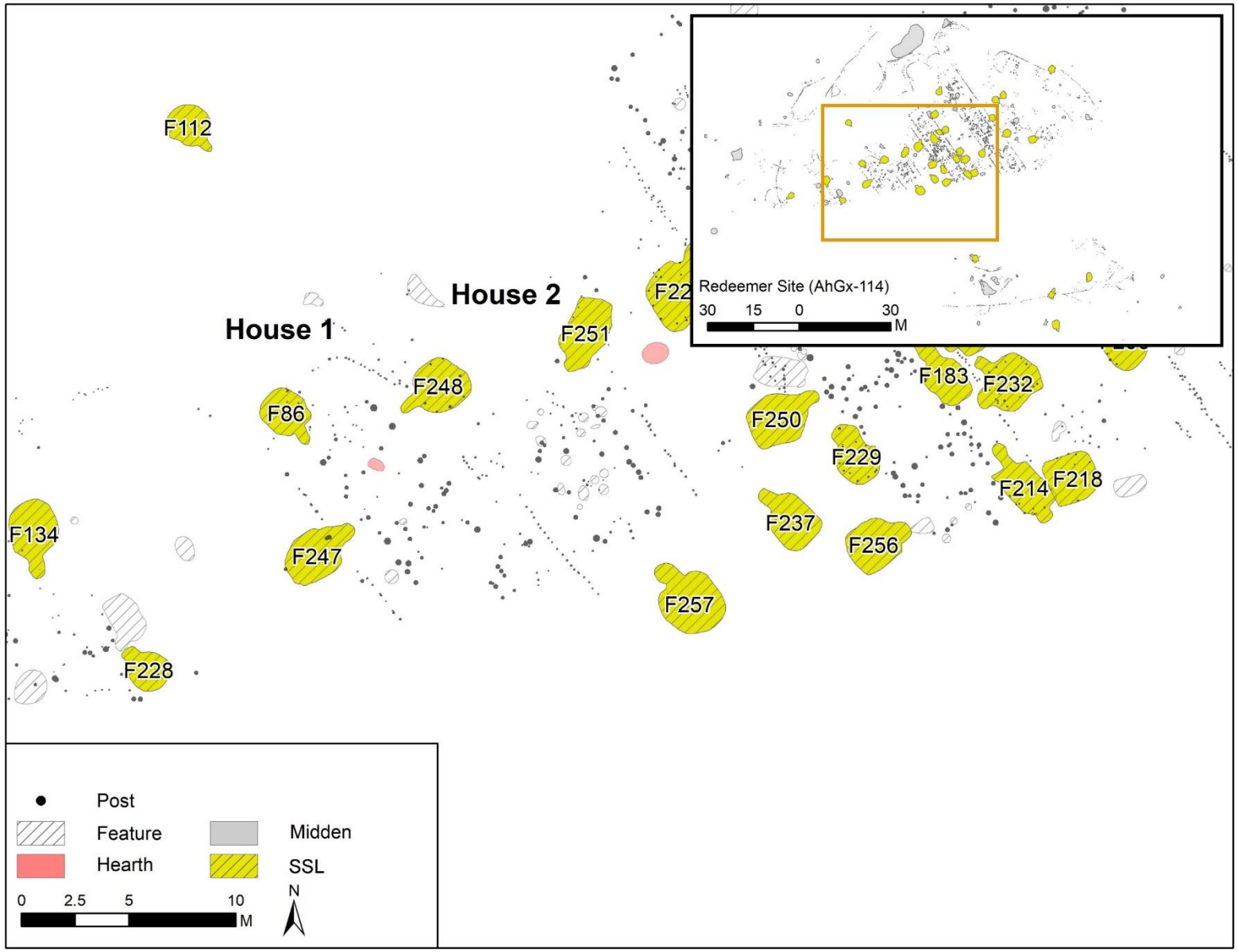
Map 1: Redeemer Settlement Patterns

2.5.3.1 House 1

Only the north end of House 1 remained intact, with the access road having destroyed most of the house remnants (Map 2). Of the visible remains, the house measured at least 15.5 m in length and 6.8 m in width, and was oriented on a northwest to southeast axis like most of the houses on the site. Post mould wall density suggests the house was not in use for as long as Houses 3 and 4, which each had more post moulds and features. One unique characteristic of House 1 was that it was in very close proximity to House 2, with the two houses almost appearing to share a wall. However, a short row of seven posts south of Feature 248 may have been the remnants of the east wall of House 1. It was not known whether Houses 1 and 2 were contemporaneous, though given the unlikelihood of two houses sharing a wall, it seems probable they were occupied at different times. Cubicle space at the north end of House 1 appeared to be minimal, suggesting space may not have been a concern for the residents of this structure. The width of House 1 was similar to Houses 2 and 5, which were slightly narrower than Houses 3 and 4. Six cultural features were positively identified within House 1 including three SSLs, one centrally located hearth, one ash pit, and one storage/refuse pit.

2.5.3.2 House 2

Only the northern midsection of House 2 remained and measured at least 13.7 m in length and 6.9 m in width (Map 2). House 2 was oriented on a northwest to southeast axis. Located immediately adjacent to House 1 and 6 m from House 3, House 2 contained 17 cultural features including eight ash pits, six refuse/storage pits, two SSLs, and one non-cultural feature. House 2 had a high density of ash pits per square metre relative to other houses on the site. While initial analysis suggested that the end of House 2 may have been located on the south side of the road, this did not ultimately seem to be the case given the angles of the posts and the curvature of the possible south house end. No evidence of the north end of House 2 was visible in the field, and this may have been the result of poor preservation. Some instances of a house lacking an end have been documented on other sites, and it has been suggested that posts at house ends may have been shallowly placed, as they were not weight bearing (Latta 1985:48).



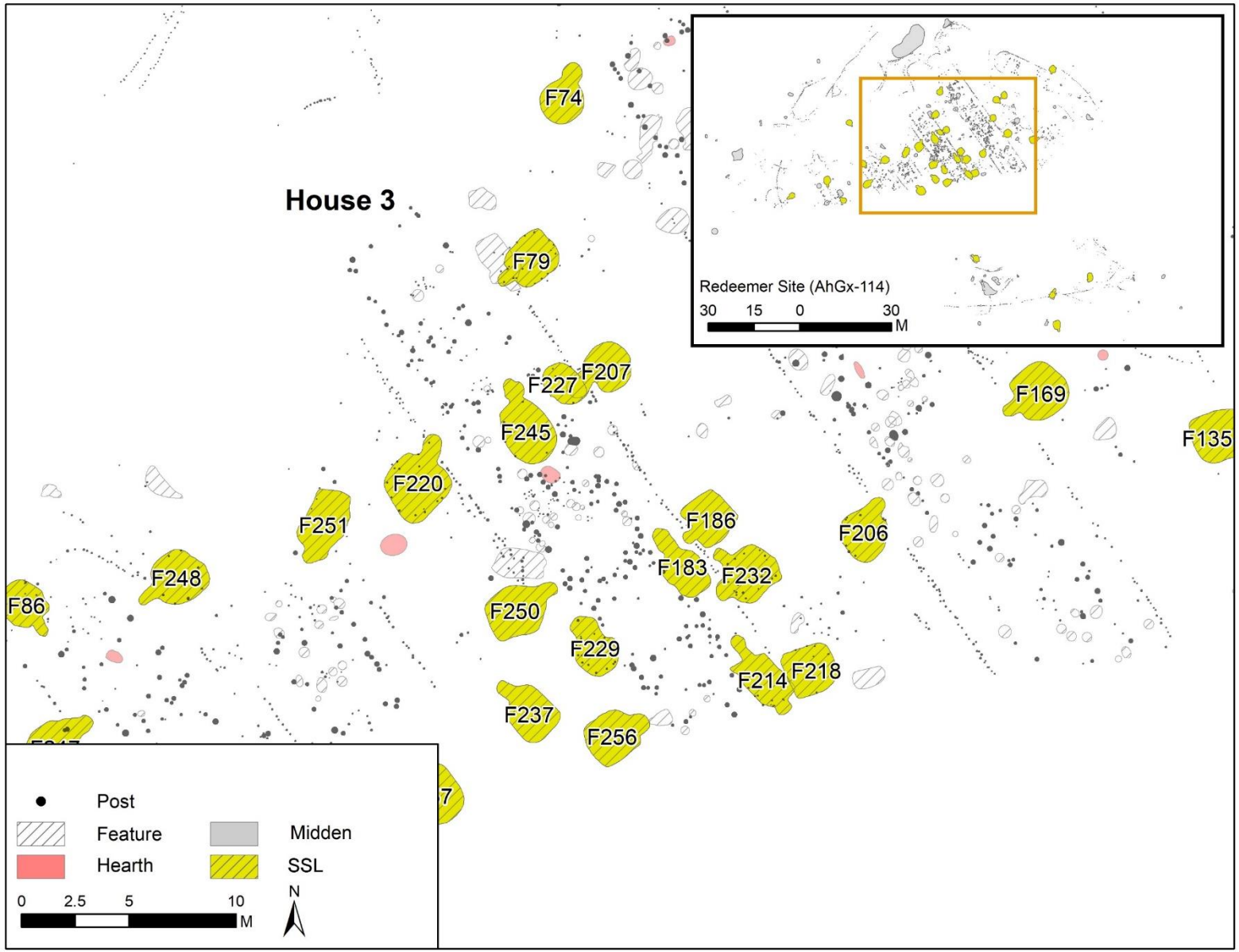
Map 2: House 1 and House 2

2.5.3.3 House 3

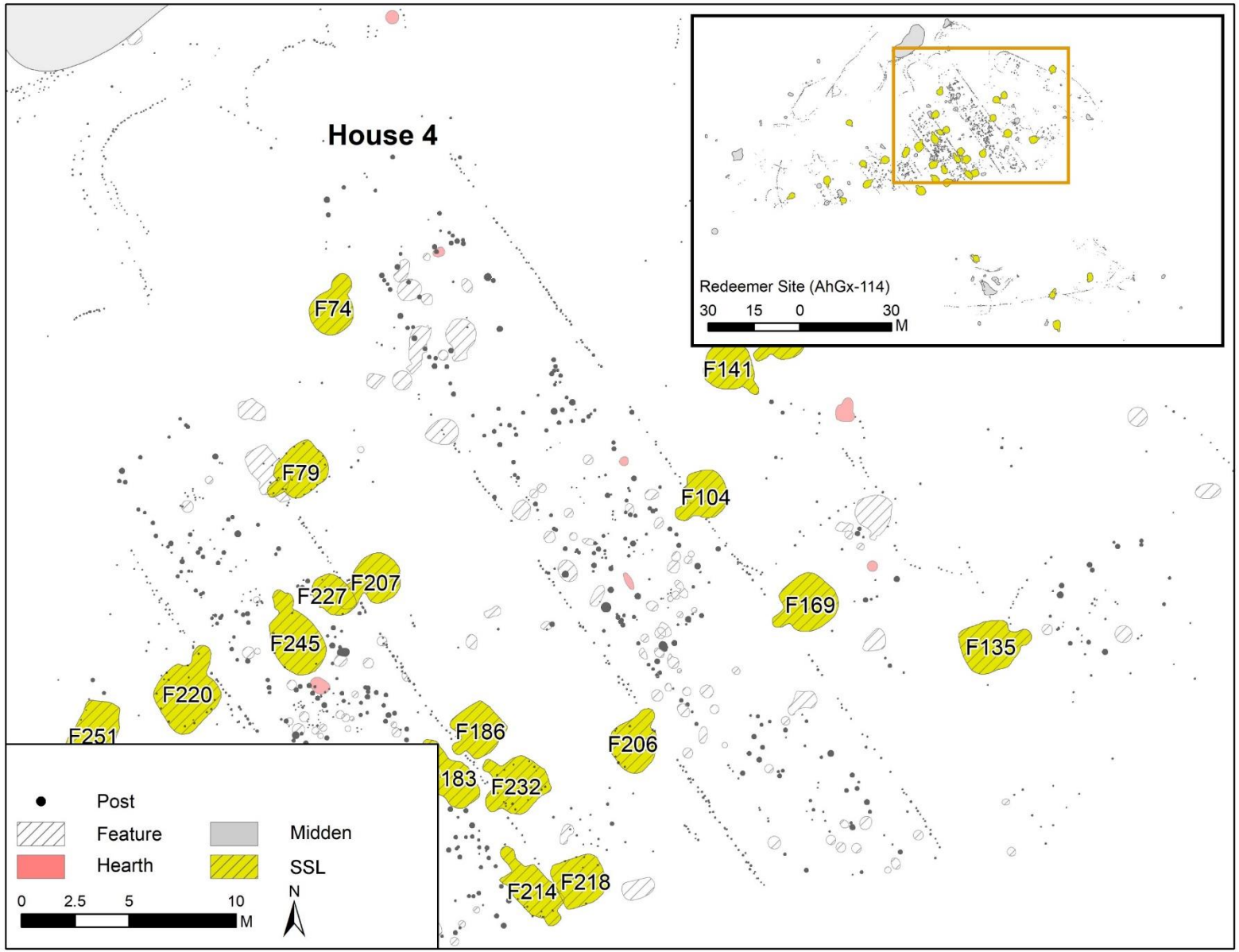
House 3 was one of the best-preserved houses on the site and had a high density of cultural features (Map 3). Located approximately 6 m east of House 2 and 8 m west of House 4, House 3 was oriented on a northwest to southeast axis. Forty-seven (47) features were found associated with House 3 including 13 ash pits, one centrally located hearth, 18 refuse/storage pits, 13 SSLs, one large post, and one non-cultural feature. One unique characteristic specific to House 3 was the unusually high density of SSLs, with House 3 containing a third of all SSLs identified at the site. House 3 measured at least 35.9 m in length and 7.5 min width. Approximately 7 m of the north end of House 3 was devoid of cultural features, and likely acted as a storage cubicle that is common to Uren period longhouses (Dodd et al. 1990). House 3 also had up to six centrally located areas that were also devoid of cultural features, defined by the presence of large supports posts that traversed the longhouse corridor and perpendicular posts that demarcated roughly square shaped areas. While these areas may have indicated the location of centrally located storage, it was also possible that they were representative of interior, above-ground sweat lodges. Such structures have been poorly documented in the archaeological literature, resulting in difficulties with inter-site comparisons.

2.5.3.4 House 4

House 4 was the most complete house identified at the site and had the highest feature density (Map 4). It was located approximately 8 m east of House 3 and was oriented on a northwest to southeast axis. House 4 measured at least 47.6 m in length and 7.6 m in width, which was a rather long house for the time period. The average length of longhouses during the Uren sub stage was 28 m (Warrick 1996:16), which increased to 38 m by the end of the Middle Iroquoian period (Crease 2011). However, comparatively few Uren villages have been excavated, creating a small sample size and making estimates unreliable. House 4 contained 78 features including 18 ash pits, three hearths, 44 refuse pits, four SSLs, six large posts (one of which contained significant ash and refuse deposits), and three non-cultural features. The highest density of refuse pits was located in House 4. House 4 also had a large storage cubicle measuring roughly 7 m in length found at its north end, similar to House 3.


House 3
F74
F79
F207
F227
F245
F220
F251
F248
F86
F250
F229
F237
F256
F186
F183
F232
F206
F214
F218
F169
F135
Redeemer Site (AhGx-114)
30 15 0 30
M
Post
Feature
Hearth
Midden
SSL
0 2.5 5 10
M
N

Map 3: House 3


House 4
Redeemer Site (AhGx-114)
30 15 0 30
M
F74
F141
F79
F104
F207
F227
F245
F169
F135
F220
F251
F186
F206
183
F232
F214
F218
Post
Feature
Hearth
Midden
SSL
0 2.5 5 10
M
N

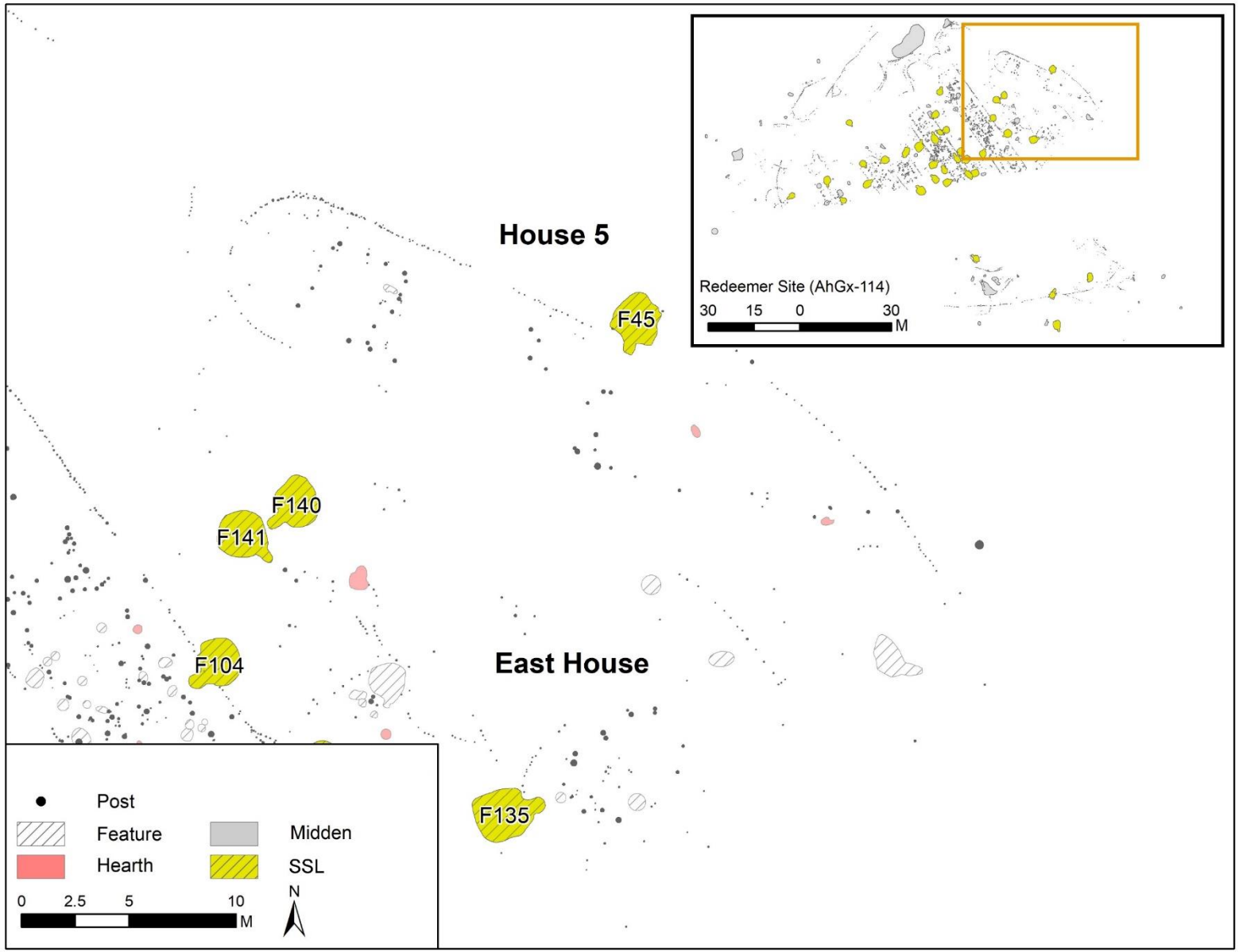
Map 4: House 4

2.5.3.5 House 5

Only the north end of House 5 remained intact, and it was the most eastern structure at Redeemer (Map 5). House 5 is unique in that it is the only house that is clearly oriented in a different direction than the other houses on the site, being oriented more west-northwest. House 5 was also close to the eastern palisade wall, and when projecting the south end of House 5, it was clear the structure would have intersected with the palisade wall. Given the complete lack of features associated with the south end of House 5 it was impossible to suggest which structure was erected first. This was similar to the Northwest House that intersected with the western palisade wall, and the possible South House that intersected with the south palisade wall. Only four cultural features were confirmed in association with House 5 including one refuse pit, two centrally located hearths, and one SSL.

2.5.3.6 Northwest House

The Northwest House is the most western structure identified at Redeemer and was among the worst preserved (Map 6). Only the very north end of the Northwest House remained, and only a single cultural feature, a SSL, was identified in association. However, it appeared that the Northwest House was aligned on a northwest to southeast axis similar to Houses 1 to 4 and the possible West House. While the post density demarcating the end of the house suggested a similar length of occupation as Houses 1, 2 and 5, the paucity of preserved settlement patterns at this location meant little could be said regarding this structure. A bunk line was preserved at the north end and demonstrated a similar storage cubicle pattern to that seen in Houses 3, 4, and 5. Of note, the west palisade wall intersected centrally through the house. Unfortunately, it was not possible to determine which structure was built first, and the limited remnants of the Northwest House did not allow for comparisons to be made with the other houses on the site.



Map 5: House 5 and East House

Map 6: Northwest House and West House

2.5.3.7 West House

The possible West House was located equidistant between House 1 and the Northwest House, being approximately 7 m away from each structure (Map 6). The identification of the West House was premised on a cluster of seven house-related cultural features including four large refuse/storage pits, two SSLs, and one refuse pit. The features were clustered in a rough longhouse shape, and two parallel lines of large posts were present, reminiscent of the bunk lines seen in other houses on the site. The West House appeared to be oriented similarly to Houses 1 through 4 and the Northwest House. However, there was a complete lack of post moulds demarcating the exterior walls of the longhouse, which gave rise to questions about whether the cluster of features represented a poorly preserved house or an outdoor activity area.

2.5.3.8 East House

Initial theories on the possible East House suggested that the house was located east of House 4 and west of House 5, and may have had a similar orientation to House 5 (Map 5). The East House was identified based on the presence of 11 cultural features including two ash pits, two unaligned hearths, four refuse pits and three SSLs. However, further inspection demonstrated the irregular and diffuse nature of these eastern features, which appeared to be separated into north and south clusters. The north cluster was comprised of two unaligned hearths, two SSLs, and three refuse pits, and together do not have a clear association with the south cluster. The south cluster contained a post line that was suggestive of the north end of a longhouse, as well as one SSL and a series of larger posts reminiscent of bunk lines. However, the shape of this cluster was more round than oblong, and may have denoted a small and more circular structure, perhaps for visiting families or trading partners. As a result, it was a distinct possibility that the north cluster of features represented either an external activity area or a second small structure on the site with a central hearth, and that the south cluster may have represented a second structure. No separation of these eastern feature clusters into distinct ‘structures’ was completed for this research due to the uncertainty of the settlement patterns.

2.5.3.9 South House

The possible South House was located along the southern margins of the site (Map 7). Very little remained of this structure. One clear line of posts crossed the south palisade wall and, if one projects the post line northwest, it would have intersected with the neck of a SSL. A discontinuous

line of posts was located roughly 7 m to the northeast, and again, if projected north, would have intersected with the neck of a second SSL. A third SSL (Feature 18) was located between the two other SSLs, immediately adjacent to the palisade wall, though the identification of this feature as an SSL is uncertain. Given the bilateral symmetry of SSLs often seen in longhouses, which was common at Redeemer, the existence of a South House was certainly possible. If accurate, the South House shared the same alignment as House 5. The south palisade wall intersected this possible structure and its associated western SSL. During excavation, care was taken to discern whether the palisade posts intruded into the SSL; if intrusion was apparent, it would suggest the palisade was constructed after the SSL. While conditions were excellent for recognizing intrusive posts, none were observed, so it was inferred the longhouse and the attached SSL postdated the south palisade wall. As noted by the excavators, the dismantling of a section of palisade wall to allow for the later construction of longhouses was consistent with patterns observed at other sites during this time period.

2.5.3.10 Middens

Two middens were documented at Redeemer (Map 1). The south midden (F30) was located just north of the south palisade wall, centrally within the site. The midden demonstrated a relatively shallow depth (less than 20 cm in depth) with significant rodent disturbance. Two depositional layers with artifacts were separated by a layer of light yellow brown soil, similar to the surrounding subsoil, suggesting the possibility that the midden may have experienced a period of disuse. Unfortunately, it did not appear that layer-specific artifact data was collected, and so it was not known whether the light yellow-brown soil layer was sterile. This made comparisons by depositional layer, and therefore temporal distribution, impossible. However, this small midden was clearly not in use for a long period given its size and depth. Only 1,644 artifacts were recovered from the south midden including ceramic pipe and vessel fragments, lithic debitage and tools, and faunal and floral remains. The north midden was substantially larger measuring approximately 12 m by 5 m and was located just south of the north palisade wall, centrally within the site. The midden had a maximum depth of 6 cm and was described as a very dark brown to black organic soil with charcoal and ash inclusions. It was assumed that plough action disturbed the upper layers of the midden. This speculation was supported by the relative uniformity seen in the ceramic assemblage. Over 10,000 artifacts were recovered from the north midden.

Map 7: South House

Diagnostic artifacts include 26 ceramic vessels, 12 pipes, eight projectile points, 34 bifaces, one drill, five scrapers, celts, three steatite bead fragments, nine modified bone, and 11 carbonized corn fragments.

2.5.3.11 Special Purpose Pit

A single example of a special purpose pit was identified at Redeemer (Map 1). Located along the north palisade wall and east of the midden, Feature 41 was described as a large, irregularly shaped pit containing two distinct layers of fire reddened soil with fire cracked rock (Map 1). The pit measured approximately 4 m by 3 m and extended 34 cm in depth. Excavation of this feature revealed six primary stratigraphic layers, alternating between sterile soil and burn layers, with a refuse deposit on the surface. Of the two burn layers, both were described as containing significant deposits of fire cracked rock, charred wood and plant remains, and ash. The lower burn layer was black and ash soil while the upper burn layer was an orange-red sandy loam. Two main theories regarding feature function were posited. The first was that it may have been used either for roasting large animals or as a smoking pit to preserve meats. The second was that the pit was used to heat stones for use in sweat bathing ceremonies, which explained the distribution of fire cracked rocks on the surface of the burn layers.

2.5.3.12 Summary

In summary, the Redeemer settlement plans demonstrated the village spanned approximately one hectare and was surrounded by a palisade wall that saw several stages of construction, dismantling, and reconstruction to accommodate the growth of the community. Five confirmed longhouses were identified, and an additional four possible longhouses were encountered. Of the four possible longhouses, the Northwest House and the West House appeared to be the most convincing given the available settlement pattern data. The area identified as the East House potentially represented one or two smaller structures, but, without additional post mould data, it was difficult to make more definitive conclusions. The South House had the least compelling evidence, based only on one continuous line of post moulds, one parallel but discontinuous line of post moulds, and two SSLs showing bilateral symmetry, a characteristic seen elsewhere on the site. If the South House were not the remnants of a longhouse, the placement of the SSLs at this location would be very unusual.

The poor preservation of the settlement patterns at Redeemer did not allow for a detailed reconstruction of site settlement history. It was not possible to identify whether the houses were contemporaneous based on settlement patterns, and it could only be stated that, if the South House did represent a longhouse, it was likely constructed after the palisade wall. Similarly, the north palisade wall, which appeared to have undergone at least two building events, was likely moved further north to accommodate the north midden. It seemed clear based on the intersection of the palisade wall with both the Northwest House and House 5 that palisade construction must have been a fluid activity that changed to accommodate village settlement. Poor preservation also made estimation of village population untenable. In general practice, longhouse length coupled with the number of central hearths has been used as a standard method for determining house and village population. However, given the incomplete longhouse data and lack of centrally located hearths, this task could not be completed. A study on population dynamics undertaken by Warrick (2000) suggested that the during the Uren phase, village population averaged between 400 and 500 individuals (Warrick 2000:440), and given the size of Redeemer, this seems an appropriate estimate.

2.5.4 Artifact Assemblage

The following presents a summary of the artifact assemblage recovered from Stage 4 excavations at Redeemer completed in 2005/2006 (Woodley 2008) and 2008/2009 (Woodley 2012). Overall, 52,747 artifacts were recovered from the site including ceramics (8.2%), lithics (54.9%), modified copper (0.01%), modified faunal (0.2%), unmodified faunal (35.6%), and floral specimens (1.0%). Additionally, 136,137 grams of ceramic bodysherds were recovered during the 2008 excavation, and were weighed rather than counted. Based on the recovered artifact assemblage, the site was dated to the Uren substage of the Middle Ontario Iroquoian Tradition (AD 1280 to 1330), and was believed to reflect an intensive but short-term village occupation that likely began around AD 1320 and lasted approximately 10 years. The artifacts are summarized in Table 3, and brief descriptions of each artifact class follow below.

Table 3: Artifact Summary by Material and Class

Material	#	%	Class	#	%
Ceramic	**4348**	**8.2**	Ceramic Pipe	113	0.2
			Ceramic Vessel (counted)	4230	8.0
			Ceramic Bodysherds*	136,137g	n/a
			Miscellaneous Ceramics	5	0.0
Lithic	**28980**	**54.9**	Debitage	28082	53.2
			Formal Tools	220	0.4
			Ground, Pecked, Polished, Other	71	0.1
			Informal Tools	608	1.2
Modified Copper	**3**	**0.01**	Modified Copper	3	0.01
Modified Faunal	**99**	**0.2**	Modified Faunal	99	0.2
Unmodified Faunal	**18764**	**35.6**	Unmodified Faunal	18764	35.6
Unmodified Floral **	**553**	**1.0**	Floral	553	1.0
Total	**52747**	**100.0**			

*ceramic bodysherds from 2008 were weighed only, and are not included in total artifact count

** floral counts only from 2008 assessment; 2005 data missing

2.5.4.1 Ceramics

Ceramic Pipes:

One hundred and thirteen (113) ceramic pipe and pipe fragments were recovered from Redeemer including 49 bowl fragments, 21 fragments that mend to form six complete pipes, 11 elbow fragments, 19 mouth fragments, and 12 stem fragments. The Redeemer smoking pipes were typical of the Uren substage of the Middle Iroquoian period. Most pipes bowls were vertical and straight with either an absence of decoration, or relatively idiosyncratic punctates or incising (Table 4). The presence of a human effigy and proto-trumpet pipes at the site was suggestive of a complex pipe industry more commonly seen in the Middleport substage.

Table 4: Summary of Pipe Bowls by Form and Decoration

Bowl Form	#	%	Decoration	#	%
Conical	**3**	**6.1**	Plain	3	6.1
Constricted	**1**	**2.0**	Plain	1	2.0
Convex	**3**	**6.1**	Plain	3	6.1
Cylinder	**21**	**42.9**	Complex Incised	4	8.2
			Plain	12	24.5
			Punctates	4	8.2

Bowl Form	#	%	Decoration	#	%
			Ring	1	2.0
Pseudo-Collar	**3**	**6.1**	Plain	2	4.1
			Ring	1	2.0
Psuedo-Trumpet	**1**	**2.0**	Plain	1	2.0
Square	**1**	**2.0**	Punctates	1	2.0
Straight	**1**	**2.0**	Plain	1	2.0
Vasiform	**1**	**2.0**	Complex Incised	1	2.0
Unknown Form	**14**	**28.6**	Complex Incised	3	6.1
			Effigy	1	2.0
			Plain	3	6.1
			Punctates	5	10.2
			Unknown	2	4.1
Total	**49**	**100.0**			

As described in the 2005 report (Woodley 2008), the human effigy pipe was recovered from Feature 31, an SSL in the south half of the site that was not associated with a house. The human effigy was well made with the eyes and mouth constructed by impressing an awl or dowel like object deeply into the mass of the clay. The mouth is set into a bulging area below the nose giving a clear impression that the face was in the act of blowing. Interestingly, there are two indentations on either side of the mouth suggesting an attempt to represent the corners of the mouth.

Ceramic Vessels:

The ceramic vessels of Redeemer were formerly subject to a typological analysis by NDA per MacNeish (1952) and Wright (1966). Three hundred and ninety-four (394) vessels were identified in total based on cross-mends. In general, the pots were noted as being typical of the Middle Stage of the Ontario Iroquoian Tradition. The bodies were globular with an outflaring, constricted neck. While most vessels were either collarless or had incipient collars, developed and well-developed collars were also noted. The Redeemer site was dominated by Ontario Horizontal (45.2%), Iroquois Linear (24.9%), and Ontario Oblique (10.9%) types, and which was unambiguously a Middle Iroquoian assemblage (Table 5). Given the relatively high frequency of Iroquois Linear vessels, it seemed clear the ceramic assemblage could be assigned to the Uren sub stage. There were, of course, survivals of Early Iroquoian ceramics, such as Glen Meyer Oblique and Linear Stamp, as well as Middleport styles, including Middleport Oblique and Criss-Cross.

Table 5: Summary of Ceramic Vessels by Type

Type	#	%
Ontario Horizontal	178	45.2
Iroquois Linear	98	24.9
Ontario Oblique	43	10.9
Middleport Oblique	29	7.4
Goessens Punctate	11	2.8
Middleport High Collar	5	1.3
Plain Collar	5	1.3
Glen Meyer Linear Stamp	4	1.0
Plain Collarless	8	2.0
Stafford Dentate	3	0.8
Ontario Horizontal and Iroquois Linear	2	0.5
Middleport Criss-Cross	2	0.5
Black necked	1	0.3
Glen Meyer Oblique	1	0.3
Corded Collar	1	0.3
Juvenile	3	0.8
Total	**394**	**100.0**

Miscellaneous Ceramics:

Miscellaneous ceramics were represented by two gaming discs and three waste items.

2.5.4.2 Lithics

The lithics class was comprised of debitage (28,082), formal tools (220), informal tools (608) and ground, pecked, polished, and other stone items (71). Chipped lithics were the result of modification by percussion and pressure flaking, although grinding or abrasion during use also occurred. Ground, pecked, polished and other stone artifacts were classified separately. While chipping may have been an initial modification, the working edges of these lithics were primarily the result of grinding and abrasion, which were more suited to less silica rich toolstone. Material type was identified for the assemblage, and is presented in Table 6 by order of frequency, and classified as either chipped stone or ground, pecked, polished and other stone.

Table 6: Summary of Lithics by Material

Chipped Stone	**#**	**%**	***Ground, Pecked, Polished, Other***	**#**	**%**
Onondaga Chert	24579	84.8	Dolomite	25	0.1
Haldimand Chert	1883	6.5	Schist	22	0.1
Unknown Chert	1834	6.4	Unknown Stone	9	<0.1
Ancaster Chert	564	1.9	Steatite	8	<0.1
Kettle Point Chert	26	0.1	Siltstone	2	<0.1
Upper Mercer Chert	21	0.1	Gneiss	1	<0.1
Chalcedony	2	<0.1	Granite	1	<0.1
Cortical	1	<0.1	Quartzite	1	<0.1
Crinoid	1	<0.1	Sandstone	1	<0.1
			Slate	1	<0.1
Total	***28910***	***99.7***		***71***	***0.3***

Debitage:

Debitage was comprised of debris resulting from the lithic reduction processes used to create formal and informal tools and chert flakes were occasionally used as tools themselves. At Redeemer, the debitage assemblage included 28,082 flakes, or 53.2% of the overall artifact assemblage. Little analysis has been completed to date on the debitage assemblage beyond identification of toolstone.

Formal Tools:

Formal tools were lithic artifacts that were inferred to have been modified to meet specific functions and included formal bifaces (108), drills (9), preforms (2), projectile points (66), scrapers (30), and unifaces (5). Of the 66 projectile points, 10 were too fragmentary to determine type. The majority were examples of points common in the Late Woodland period, including Levanna (5), Madison (37), and triangular (1) and triangular side-notched (1) varieties. Additionally, 12 examples of Early Archaic to Early Woodland projectile points were also recovered including Ace-of-Spades (1), Adena Stemmed (2), Brewerton Ear Notched (1), Brewerton Side Notched (1), Crawford Knoll (1), Genesee (1), Lamoka (2), Meadowood (1) and Nettling (2) varieties. The appearance of earlier point types within the assemblage was unsurprising given the excellent site settlement conditions. However, nine of the 12 earlier projectile points were recovered from

feature and post mould contexts, suggesting these points were likely collected by the Middle Iroquoians of Redeemer and were at some point deposited at the site.

Informal Tools:

The informal tools at Redeemer included cores (119), retouched flakes (155), utilized flakes (208), and wedges (126).

Ground, Pecked, Polished, and Other Stone:

Ground, pecked, polished, and other stone is a class of lithic objects for which grinding, abrading, and polishing were the primary modifications present on the stone objects. This class included abraders (3), abrader/hammerstones (1), an adze bit (1), an axe bit (1), a celt bit (1), a celt poll (1), celt fragments (18), a pipe stem turned pendant (1), and seven unknown objects. Other stone objects included an anvil (1), beads (4), a crinoid fossil (1) a gaming disc (1) a gorget (1), a metate (1), a net sinker (1), pipe bowls (4), a wedge (1), and a whetstone (1).

2.5.4.3 Modified Copper

Three copper objects were recovered from SSLs at Redeemer. Copper is found in deposits in the western Lake Superior Basin on the Canadian Shield and in glacial drift south of Sault Ste. Marie (Hewitt 1972). To be present on the site, copper would have either been traded as a raw material or as a finished product. A copper bead was recovered from Feature 218, and was formed from a flattened strip and coiled into a bead. A copper disc was recovered from Feature 257 in the head of the SSL and was formed from a coiled length of copper that was flattened into a circular disc. Finally, a copper awl was recovered from the head of Feature 86. One tip was curved and flattened, perhaps due to use, and the other was splintered. The shaft was rectangular in profile and tapered towards the tip.

2.5.4.4 Modified Faunal

Modified faunal objects recovered from Redeemer included items manufactured from both antler (9) and bone (90). The modified antler category included awls (2), pressure flakers (3), a projectile point (1), a toggle projectile point (1), and unknown objects (2). The modified bone category included awls (46), beads (30), a bracelet (1), toggles (6), pins (5), miscellaneous (1), and a modified deer tibia (1).

2.5.4.5 Unmodified Faunal

A complete analysis of the unmodified faunal remains was completed for the 2005 and 2008 Stage 4 excavations of Redeemer, and faunal reports are included as appendices within the archaeological assessment reports (Woodley 2008, 2012). A total of 18,765 faunal specimens were recovered from Redeemer. In terms of zoological class, mammals dominated in the assemblage, followed by fish, birds, reptiles, amphibians, and molluscs, respectively. Identified mammal species included the eastern cottontail, eastern chipmunk, grey squirrel, woodchuck, muskrat, beaver, domestic dog, and white-tailed deer. Fish remains were most frequently of the brown bullhead, though examples of lake sturgeon, bowfin, lake herring, northern pike, redhorse species, sucker family species, burbot, white bass, pumpkinseed, and walleye were also identified. Of note were the deeper water species, such as lake sturgeon and burbot, which would have required fishing in Hamilton Harbour or the open waters of Lake Ontario. Identified bird species included owl, ruffed grouse, passenger pigeon, and perching bird (Passeriformes) species. The distal phalanx of the single owl specimen was recovered from the floor of Feature 24, one of the SSLs. Of the reptiles, examples of snapping turtle, painted turtle, and Massassauga rattlesnake were all identified, the latter of which was recovered from the northern midden. Finally, small counts of frog/toad species and molluscs were also recovered.

2.5.4.6 Floral

The following floral assemblage summary accounts only for the 2008 assemblage; data from 2005 (south half of the site) is no longer extant. The archaeobotanical remains recovered from the Redeemer site included typical domesticated and wild plant remains. Eleven species of trees were identified, including sugar maple, white elm, hickory, ironwood, beech, ash, red and white oak, chestnut, and butternut/black walnut. Domesticated species present within the assemblage included maize, a possible tobacco seed, and limited examples of bean lobes, squash seeds, and sunflower seeds. While maize was recovered from across the site, the bean, squash, and sunflower examples were all recovered from House 3. Among the fleshy berries, bramble seeds dominated and were widespread among many features. Other fleshy fruits were present in only small numbers, as were the nut remains and miscellaneous plants. Identified nut remains included acorn, butternut, hickory, and walnut. The single walnut was recovered from House 3. Fleshy fruit

remains included brambleberry, sumac, hawthorn, mayapple, strawberry, and possibly blueberry. Other miscellaneous plants consisted of chenopod, milkweed and grass.

2.5.4.7 Summary

The Redeemer site artifact assemblage is consistent with a Uren substage occupation. The ceramic assemblage is dominated by Ontario Horizontal (45.2%), Iroquois Linear (24.9%), and Ontario Oblique (10.9%) vessels. Given the relatively high frequency of Iroquois Linear vessels, it seems clear the ceramic assemblage can be assigned to the Uren substage. As expected, there are a few survivals of Early Iroquoian ceramics such as Glen Meyer Oblique and Linear Stamp, and some later Middleport styles such as Middleport Oblique and Criss-Cross. The presence of well-developed collars on several vessels further supports a late Uren occupation. The ceramic pipe assemblage also provides evidence of a late Uren date for the site. Specifically, the recovery of human effigy and proto-trumpet pipes suggests a complex pipe industry was developing at the site, which is more commonly seen in the Middleport substage. Based on the recovered ceramic objects, the site represents an intensive but short-term village occupation that likely began around AD 1320 and lasted approximately 10 years.

The lithic assemblage demonstrates that primarily local sources of chert were used to produce tools. The assemblage was dominated by Onondaga chert (84.8%), with smaller quantities of Haldimand, Ancaster, and Kettle Point chert varieties also identified. The limited presence of Upper Mercer chert is suggestive of trade, with source outcrops being found in eastern Ohio (Wilmarth 1937; Converse 2007). Diagnostic lithics demonstrated that most of the projectile points were small triangular points common to the Late Woodland period. Twelve Early Archaic to Early Woodland projectile points were also recovered, nine of which were encountered with post moulds and features associated within the village occupation. This suggests the points may have been collected by the Middle Iroquoians of Redeemer and were deposited at the site. A well-developed ground, pecked, and polished stone toolkit was also identified at the site. Identifiable tools included abraders, adzes and axes, an anvil and a metate, a netsinker, a wet stone, and a wedge. This toolkit is indicative of woodworking, fishing, and food processing.

Three copper objects were also recovered from the site including a bead, and awl, and a disc. Copper deposits are found in the western Lake Superior Basin on the Canadian Shield and in glacial drift south of Sault Ste. Marie (Hewitt 1972). It is unknown whether the objects recovered from the site were traded as raw material or finished products. In addition to the copper

assemblage, a variety of modified faunal items were recovered including awls, beads, pins, pressure flakers, and projectile points. The modified faunal assemblage is again consistent with a Middle Iroquoian occupation for the site.

The unmodified faunal assemblage demonstrates that a variety of species were being consumed by the Redeemer community and could have been procured locally. Only a few notable fish species would have required travel to obtain, being deeper water species that would have required fishing in the Hamilton Harbour or the open waters of Lake Ontario. The archaeobotanical remains recovered from the Redeemer site include both the typical domesticated and wild plant remains, probably locally procured (Woodley 2008, 2012). While storage was almost certainly practiced and may have included resources acquired from seasonal use of locals outside the village confines, no specific season of occupation of this community can be directly inferred (Woodley 2012). However, based on the density of features at a number of the longhouses on site, it seems likely that the village was occupied year-round.

3.0 RESEARCH METHODS

3.1 Descriptions of Sweat Lodges

A detailed description of each SSL identified at Redeemer is provided. Field notes and unpublished archaeological assessment reports were reviewed to consolidate data on each feature. Information on SSL location and alignment is provided along with dimensional attributes. The presence or absence of perimeter posts is noted along with basal layer descriptions and a description of feature infilling. The results of this data compilation are presented in Section 4.1. In addition to the summaries, APPENDIX I has been included to provide more detailed information on each SSL including feature stratigraphy and plan and profile drawings.

3.2 Spatial Analyses

The spatial data considered for this research included location, alignment, and the presence/absence of bilateral symmetry. For the purposes of this research, 'location' referred to where a SSL was situated within the village plan. There were 10 locations utilized for these analyses. These locations included Houses 1-5, the Northwest, West, East, and South Houses, and SSLs external to a house. All locations were treated as separate categories for the analyses. There were notably poor settlement patterns for the East and South Houses. Analyses of location included an assessment of the number of SSLs within each house, a calculation of the percentage of area occupied by SSLs within each house living space area, and a determination of SSL contemporaneity. House living space area was calculated by adding together the observed house area and the area of appended SSLs that were located outside of the longhouse walls. Descriptions of SSLs that were external to houses were also completed to provide a better understanding of how they were distributed across the village. 'Alignment' pertained only to those SSLs associated with a house and included the following four categories of SSLs: 1) those appended to a longhouse wall; 2) those located within the bunk line of a longhouse; 3) those located within the central corridor of the longhouse; and 4) those with unknown locations. Analyses of alignment included tallying the number of differently aligned SSLs within each house. Finally, the 'presence/absence of bilateral symmetry' referred to whether SSLs appended to a longhouse wall or located along the bunk line were mirrored by an SSL located on the opposite side of the longhouse. While data on bilateral symmetry was noted, additional analyses were not completed as it was unknown

whether SSLs presenting bilateral symmetry were contemporaneous. The spatial characteristics of the Redeemer SSLs are explored in Section 4.2. SSL spatial data was then related to SSL morphological attributes in Section 4.3, and artifact distributions in Section 4.4.

3.3 Morphological Analyses

The form and structure of SSLs have been described on numerous occasions in the literature (MacDonald 1988; MacDonald and Williamson 2001; Birch 2015; Braun 2015). SSLs are flat-bottomed pits with a keyhole shape and which contain a ramped entrance leading down into the structure. A basal layer is commonly noted at the bottom of the pit, believed to have been deposited during the use of the structure. The superstructure of the SSL was supported by posts, which are seen in the archaeological record either at the bottom of the pit below the basal layer, or as a ring around the perimeter of the feature. Coverings could have included skins, bark, or sod. At the end of the feature's use, it was filled in with layers of sterile subsoil, sometimes containing lenses of artifact-rich soil. In many instances, surficial refuse layers are noted as very dark brown to black, artifact-rich deposits. It is likely these upper refuse layers were deposited over time, after the SSL was filled, rather than being a rapid infilling event.

The current research seeks to provide an exploratory analysis of the life history of the Redeemer SSLs through an in-depth examination of dimensional attributes, ramped entrances, perimeter posts, basal layers, and infilling processes. Where applicable, a variety of statistical tests were applied to both continuous and categorical data to identify whether any trends across the site are present. Statistical testing was aimed at identifying differences in form and structure between differently located SSLs (house vs. external to house, and between different houses) and differently aligned SSLs (central corridor, bunk line, appended). Testing was also focused on the variability of SSLs within each house, depending on alignment. For all statistical analyses, a statistical consultant was employed to conduct the tests and provide outputs. The datasets involved were provided to the statistical consultant by the researcher along with a set of null and alternative hypotheses developed by the researcher. Statistical testing was completed using SPSS software. All measurements are reported on in centimetres (cm).

For all statistical results, p-values at the 5% significance level or lower were considered statistically significant. However, in some cases, significance levels of 10% or below were also reported. Given the low power (small sample size) and the exploratory nature of these analyses, it

is considered worthwhile to note findings at the 10% level since they may signify that certain trends exist in the data (Burdette and Gehan 1970). Small sample sizes or high dispersion in samples (e.g. heterogenous samples) may result in higher, non-statistically significant p-values, even where true effects do exist (du Prel, Hommel, Rohrig and Blettner 2008). Consequently, where p-values greater than 0.05 and less than 0.1 were identified, and no statistically significant results were documented for supporting the rejection of a null hypothesis, trends towards significance were reported, with caution advised for interpretation of results. Given the lack of other similar research to date, trends towards significance identified in this research may provide insights into future research questions that could be addressed using larger sample sizes.

3.3.1 Dimensional Attributes

Dimensional attributes of the Redeemer SSLs were broken down into several categories including total SSL length, width, and depth of the SSL, length of the body of the SSL, and length, width, and depth of the ramped entrance. All measurements are reported in centimetres (cm). Body length was identified as the length of the main chamber of the SSL and was calculated by subtracting the length of the ramped entrance from the total length of the SSL. Descriptive statistics and tests of normality were completed for each variable.

Correlations among different dimensional attributes were the primary statistic of interest. Pearson's correlations were generated for attributes with normal distributions and Spearman's *rho* was utilized when normality was violated. To address variations in SSL dimensional attributes between SSLs that were located within houses versus those that were external to a house, an independent samples Student's t-Test was applied for attributes with distributions that approximated a normal distribution, and the Mann-Whitney U test was applied for attributes that did not conform to a normal distribution. A limitation for this analysis was that there were only four observations for the SSLs that are located external to a house. For each t-test, the Levene's test for equality of variances was completed. To assess whether there were any differences in dimensional attributes between SSLs that were located in different houses, a one-way ANOVA was completed. Several houses were removed from the dataset as they only provided a single observation (House 5 and the Northwest House). Additionally, observations from the East House were also removed as the settlement pattern data for this location was decidedly unclear. Pairwise comparisons were then explored to identify where these differences were occurring using the

independent samples Student's t-test for variables with a normal distribution and the Mann-Whitney test for variables where the normality assumption was not met.

To address variations in dimensional attributes between differently aligned SSLs (appended, bunk line, and central corridor), a set of one-way ANOVAs was conducted for attributes with a normal distribution, and the Kruskal Wallis test was applied to attributes for which the normality assumption was violated. Pairwise comparisons were then explored to identify where these differences were occurring using the independent samples Student's t-test for variables with a normal distribution and the Mann-Whitney test for variables where the normality assumption was not met. A limitation for this analysis was that there were only two observations for SSLs aligned with the central corridor.

Statistical testing was also aimed at ascertaining whether dimensional attributes varied between differently aligned SSLs, with house location included as an additional source of variation. A two-way ANOVA was used to assess the variation in dimensional attributes as influenced by both house type and alignment. House 5 and the Northwest House were excluded since they only have one observation, and the East House was removed due to poor settlement data. First, the Levene's test of equality of variances was conducted and was accepted for all dimensional attributes except for total SSL length and width, thus length and width were assessed to have heterogeneous variances. As a result, caution is advised in interpreting the results for total SSL length and width. Pairwise comparisons were then explored to identify where these differences were occurring using the independent samples Student's t-test for variables with a normal distribution and the Mann-Whitney test for variables where the normality assumption was not met. Finally, effect sizes (measured by the partial eta squared) were reviewed to assist in understanding whether there was more variation in each attribute when compared to house location or alignment.

Thirteen SSLs are in House 3, representing one third of SSLs at Redeemer. Given this unique distribution, additional analyses were completed to examine whether there were any differences in dimensional attributes between the SSLs of House 3, and all other SSLs on the site. As in previous comparisons, the Student's t-test and its nonparametric equivalent, the Mann-Whitney test, were applied.

3.3.2 Ramped Entrances

Qualitative descriptions of the ramped entrances were completed and included a summary of dimensional attributes, an exploration of ramped entrance profiles, and an examination of SSLs that contained two ramped entrances.

3.3.3 Perimeter Posts

The presence and absence of perimeter posts within SSLs was documented. Presence and absence is further explored by tallying the variable according to location and alignment. Descriptions of unique instances of perimeter posts are also provided.

3.3.4 Basal Layers

The basal layer represents the living floor of the SSL. Generally comprised of a grey ashy deposit with inclusions of charcoal, the basal layer would have accumulated throughout the use of the SSL through the treading in of soils and the of pouring water over hot stones. Robertson (2004) has suggested that basal layer thickness may be an indicator of length of use, with thicker deposits accumulating over time. Frequency of use may have also contributed to basal layer thickness. The basal layer holds special significance for a variety of reasons. For one, it is the only soil layer representative of the feature's use, with upper infill and refuse layers being deposited at the end of the feature's life-history. Additionally, as noted previously, artifacts of interest are often recovered from the surface of the basal layer including ritual-like or unique items, animal remains, and occasionally human remains.

In the analysis of the basal layer, statistical testing included descriptive statistics with interquartile ranges, tests of normality, and tests to explore correlations between basal layer thickness and SSL depth (Spearman's Correlations). To address variations in basal layer thickness between differently located SSLs (house vs. external to house, and between different houses), the Mann-Whitney U test was applied given that basal layer thickness is not normally distributed. For these tests, House 5 and the Northwest House were removed from the dataset as they only provided a single observation. For the between different houses tests, a new group was added, which includes the four SSLs that are located exterior to a house. This was completed to identify whether any variations were present between SSLs located in different houses when compared to SSLs located external to a house. When relevant, pairwise comparisons were made using the Mann-Whitney test. A limitation in this analysis is that there were only four observations for the SSLs

that are located external to a house. To address variations in basal layer thickness between differently aligned SSLs (appended, bunk line, central corridor), the Kruskal Wallis test was conducted. A limitation in this analysis is that there were only two observations for the SSLs that are located along the central corridor. Finally, a two-way ANOVA was used to assess whether there are differences in the basal layer thickness of the SSLs between different houses *and* between different SSL alignments.

3.3.5 Infilling

Infilling refers to the practice of backfilling an SSL by the site occupants following its disuse. A summary of the variations in infilling is provided, including a description of both simple and complex stratigraphy seen at the site. Differentiation is made between primarily infill layers and upper refuse layers, the latter of which are likely the result of refuse accumulation following the infilling of the feature. Analysis of infilling also includes a description of inclusions such as fire-cracked rock.

3.4 Artifact Distributions

In addition to examining SSL spatial and morphological attributes, an analysis of artifact distributions from SSL contexts was completed. This analysis involved an examination of the total assemblage count distributions (which included artifacts as well as floral and faunal remains) compared to spatial and morphological attributes, and an exploration of whether the deposition of 'artifacts of significance' within SSLs was significant when compared to other feature types at the site. For all statistical analyses, a statistical consultant was employed to conduct the tests and provide outputs. The datasets were provided to the statistical consultant by the researcher along will a set of null and alternative hypotheses developed by the researcher. Statistical testing was completed using SPSS software.

3.4.1 Total Assemblage Counts

In the analysis of total assemblage distributions between SSLs, statistical testing included tests of normality, as well as tests analyzing correlations between SSL dimensional attributes, total assemblage counts, and basal layer depths (Spearman's Correlations). To address variations in the total assemblage count between differently located SSLs (house vs. external to house, and between different houses), the Mann-Whitney U test was applied given that total artifact count is not

normally distributed. To address variations in total assemblage count between differently aligned SSLs (appended, bunk line, central corridor), the Kruskal Wallis test was conducted. Finally, a two-way ANOVA was used to assess whether there are differences in the total assemblage recovered from SSLs between different houses *and* between different SSL alignments. All measurements are reported on in centimetres (cm). Of note is that SSLs south of the access road (three in the South House, two that are external to a house) did not have complete data for total assemblage counts due to the loss of data related to faunal remains. The area of the site south of the access road contained 2,229 faunal remains from topsoil and feature contexts, while north of the access road 16,535 faunal fragments were recovered from topsoil and feature contexts. Given the low frequency of faunal remains recovered from the area south of the access road, it was decided that the tests would be completed regardless, with caution advised when interpreting the results.

3.4.2 Artifacts of Significance

An effort was made to identify whether the deposition of specific artifacts within SSLs was significant at the site. Unique artifacts or artifacts associated with ritual activities are often described as being recovered from SSL contexts within village sites. These include pipes, turtle shell, bear skulls, carved bone items, and occasionally burials (MacDonald and Williamson 2001). A recent study completed by Braun (2015) involved the examination of the deliberate breakage and patterned deposition of smoking pipes, as well as other objects seen as spiritually powerful, within SSLs at the Holly site (BcGw-58). A central question to this research is whether similar patterns of meaningful deposition of artifacts within SSLs are present at Redeemer.

But what makes an object significant to a person or people, and how can we identify this in the archaeological record? Braun's (2015) focus on the life-history of an object, communities of practice, and materiality provide a good framework from which to start. As he notes, objects can be best understood through a holistic approach that focuses on life-cycles including production, use and discard. A central idea is that as people and objects move through time and space, they begin to inform one another. Objects can accumulate histories, providing an avenue through which a person can interact with moments of significance (Godsen and Marshall 1999). Further, objects can communicate different meanings concurrently, whether profane or sacred, public or private, for groups of people or individuals (Williamson and Veilleux 2005). Thus, artifacts of significance are not simply objects used in spiritual or shamanistic activities, but any item that might enact for

its owner the process of remembering meaningful moments in time (Braun 2015). While certain artifacts such as ceramic smoking pipes may arouse ideas of spiritual or ritualistic activities, it is impossible to say that other more classically commonplace items, such as pots, did not also fulfil similar roles.

While it is certainly difficult to unpack the types of objects that may have been placed within an SSL with purpose (other than as refuse), some effort was made to do so in the analysis of the artifacts from SSLs at Redeemer. Acknowledging that the object types selected by no means represent all items that may have held significance to the occupants of the site, this research focused on items of adornment, such as bone beads, toggles, pins, and bracelets, stone beads, gorgets, and pendants, as well as items such as bone awls, and ceramic and stone smoking pipes. All copper objects were included, given their rarity at Redeemer and on sites in southern Ontario in general. While deposition of pots, projectile points, and other artifact types may be significant within SSL contexts, the high frequency with which they were recovered from SSLs and across the site in general make statistical testing less powerful. Finally, articulated animal remains recovered from the basal layer of SSLs were also considered, though are discussed separately from artifacts.

In the analysis of the artifacts of significance recovered from SSLs, statistical testing included tests of normality, and tests to explore correlations between total number of artifacts of significance and both SSL dimensional attributes and basal layer depths (Spearman's Correlations). To address variations in total number of artifacts of significance between differently located SSLs (between different houses), the Mann-Whitney U test was applied given that total number of artifacts of significance is not normally distributed. While in previous examples statistical testing was completed to compare SSLs that were located within houses versus those that were external to a house, this was not completed for the total number of artifacts of significance since only three items of significance were recovered from one SSL located external to a house. To address variations in total artifact count between differently aligned SSLs (appended, bunk line, central corridor), the Kruskal Wallis test was conducted. A limitation in this test was that there were only two observations for SSLs located along the central corridor. Finally, a two-way ANOVA was used to assess whether there are differences in the total number of artifacts recovered from SSLs between different houses *and* between different SSL alignments. Again,

effect sizes (measured by the partial eta squared) were reviewed to assist in understanding whether there is more variation in each attribute when compared to house location or alignment.

In addition to the above, statistical testing was completed to determine whether the deposition of artifacts of significance within SSLs was significant at Redeemer when compared to other feature types across the site and across houses. Total number of artifacts of significance within SSLs was compared to their deposition in ash pits, middens, post moulds, refuse pits, refuse/ash pits, refuse/middens, the special purpose pit, storage pits, and an 'other' category that included features with an unknown function and non-cultural features. To address this question, a Chi-Square test was applied. To further illustrate the results, a secondary test was applied that compared the deposition of artifacts of significance within SSLs versus their deposition in all other feature types combined. To address this question, Fisher's exact test was completed. To determine whether houses differed in terms of the feature types from which artifacts of significance were recovered, a Chi-Square test was completed. Again, a similar analysis was completed by collapsing all feature types different from SSLs and applying Fisher's exact test.

3.5 Inter-Site Comparisons

Inter-site comparisons were made between SSLs identified at the Redeemer site and those from other Iroquoian villages in southern Ontario. A review of the MTCS's Ontario Archaeological Sites Database was completed with the assistance of the database coordinator, Rob von Bitter, and all sites noted as containing SSLs were identified. Following MacDonald and Williamson (2001), sites containing SSLs were identified by geographic region and temporal affiliation. Sites were categorized temporally into three main ranges: thirteenth to early fourteenth century sites, fourteenth century sites, and fifteenth century sites, thus broadly being situated into the Early-Early Middle, Middle, and Late Iroquoian periods, respectively. For each site, the total number of SSLs, the total number of houses, and the maximum number of SSLs associated with a single house at the site were noted.

Furthermore, a selection of 18 sites (including Redeemer) spanning the thirteenth to the fifteenth centuries from across southern Ontario were selected for further analyses to act as a point of comparison for the Redeemer site. Given the temporal and regional variables, the inter-site comparisons were also aimed at identifying whether any regional or temporal variations in SSLs were present. Brief summaries of the selected sites were provided for the purposes of comparisons,

following which additional SSL analyses were completed. Stage 4 archaeological assessment reports were reviewed, and SSL data was compiled for each village site. Dimensional attributes were limited to total SSL length, width and depth. Data for ramped entrance length, width, depth, SSL body length, and basal layer depth were not compiled as the data could not be recovered consistently from all reports. SSL house location and alignment were noted for all SSLs. Longhouse living space area and SSL areas were measured and tabulated to provide an additional point of comparison between the Redeemer SSLs and SSLs found elsewhere in the province. Finally, all village sites were assigned to temporal and regional categories based on the report documentation, and analyses were completed to identify variability in SSL spatial and morphological characteristics through space and time.

As a final note, no statistical testing was completed for the inter-site comparisons given the small frequency of sites considered, and the uneven distribution of sites as they relate to regional categories. It is believed that a larger sample size that is more evenly distributed would provide greater reliability for statistical tests. Consequently, only identified trends in the data are noted.

4.0 RESULTS: THE SWEAT LODGES OF THE REDEEMER SITE

This chapter presents the results of the in-depth analysis of the Redeemer SSLs. Detailed descriptions of the SSLs are provided in Section 4.1 to provide context for the subsequent spatial and morphological analyses. The spatial characteristics of the SSLs are explored in Section 4.2 including an examination of location (house, external to house), alignment (appended, bunk line, central corridor), and presence or absence of bilateral symmetry. The morphological characteristics are explored in Section 4.3 and include the results of the analyses on SSL dimensional attributes, ramped entrances, perimeter posts, basal layers, and infilling practices. Finally, Section 4.4 provides the results of the artifact distribution analysis, which were two-pronged: first, to examine variation in the total SSL assemblage counts between SSLs, using spatial and morphological attributes as additional variables; and second, to determine whether the deposition of artifacts of significance within SSL contexts, compared to other feature types, is significant at the site.

4.1 Sweat Lodge Descriptions

The following section provides descriptions of each SSL identified at Redeemer. Summaries of each SSL are provided, with more detailed information regarding stratigraphy and plan and profile drawings provided in APPENDIX I. APPENDIX II contains tables providing summary information of dimensional attributes, total assemblage counts, and total frequency of artifacts of significance for each SSL at Redeemer. A provenience tally for all artifacts and floral and faunal remains recovered from each SSL is presented in APPENDIX III.

Feature 3

Feature 3 was associated with the possible South House, where settlement patterns remain unclear (Map 7). The SSL was oriented northeast-southwest, with the entrance from the north and with the south edge of the feature appearing to intersect with the palisade wall (Image 1). Based on the excavation results, it appeared that Feature 3 was constructed after the dismantling of the palisade wall, as no evidence of palisade post moulds was encountered. A line of posts crossed the palisade near the SSL and may represent the west wall of the South House. When projected further north, the post line would intersect with the neck of the ramped entrance, suggesting Feature 3 was appended to the west wall of the South House. The feature measured 350 cm in length, 220 cm in width, and 55 cm in depth. Sixteen perimeter posts were identified during the excavation of this

feature, and possible remnants of the super structure were noted as a thin, dark brown line of soil weaving around the posts. The basal layer was a dark grey-brown silty loam with ash and charcoal deposits that extended to a maximum depth of 4 cm. Several infilling events were then noted from the basal layer up, alternating between light brown to yellow brown subsoil and dark brown to black, artifact rich soils. Also of note was Feature 3A, a square ash pit located below the basal layer in the northeast quadrant of the feature.

Image 1: Feature 3 Plan View

Feature 18

Feature 18 was located south of the access road and may be associated with the possible South House (Map 7). It is oriented northeast-southwest with access to the ramped entrance from the north. The feature measured 190 cm in length, 85 cm in width, and 51cm in depth (Image 2). No perimeter posts were encountered during the excavation of this feature. Unfortunately, all layer data below the surficial refuse layer had been destroyed as a result of severe rodent disturbance in the form of tunnels and burrows. The determination of feature function by the excavators was based on the plan view of the feature, which shares all of the same characteristics as the other SSLs across the site including a rounded rectangular body and a head, which presumably represents the

ramped entrance. Few artifacts were recovered, making further interpretations difficult. Feature 18 is the least convincing of the Redeemer SSLs.

Feature 23

Feature 23 was located south of the access road and may be associated with the possible South House, aligned with the east wall (Map 7). The feature measured 268 cm in length, 160 cm in width, and 66 cm in depth. No perimeter posts were identified during the excavation of this feature. Feature 23 was originally identified by the ramped entrance only, with the surface of the body of the feature completely indistinguishable from the surrounding subsoil. As a result, part of the body of the feature was unknowingly destroyed prior to mapping. The basal layer was a dark grey clay with ash and charcoal inclusions. The infill layers above ranged from light brown to yellow brown sandy clay subsoil. Interestingly, no evidence of a surficial refuse layer was present.

Feature 24

Feature 24 was located south of the south palisade wall and is not associated with any known structure (Map 7). The entrance to the SSL was from the south. The feature measured 380 cm in length, 280 cm in width, and 87 cm in depth (Image 2). Excavation revealed a continuous line of dark brown soil near the periphery of the feature that consisted of a relatively thin strip of dark brown or black soil that ran continuously between circular charcoal deposits that may represent remnant posts. Similar to Feature 3, this soil layer may represent the remnants of the buried superstructure. The basal layer was a light to dark grey-brown silty loam with ash and charcoal deposits that extended to a maximum depth of 12 cm, though was thicker in the ramped entrance. Several infilling events were then noted from the basal layer up, alternating between light brown to yellow brown subsoil and dark brown to black, artifact rich soils.

Image 2: Feature 24 Plan View

Feature 31

Feature 31 was located south of the access road and does not appear to be associated with a longhouse (Map 7). It is oriented northwest-southeast with access to the ramped entrance from the north. The feature measured 320 cm in length, 220 cm in width, and 60 cm in depth (Image 3). While no posts were identified within the feature, a semi-circular line of 16 posts was located immediately to the west of Feature 31, and was likely associated with the superstructure of the SSL, perhaps acting as a windbreak or lean-to structure. The basal layer was a dark grey to black sandy loam with charcoal inclusions and surficial but discontinuous ash deposits located on the surface of the basal layer. The basal layer extended to a maximum depth of 9 cm. Several infilling events were then noted from the basal layer up, alternating between light brown to yellow brown subsoil and dark brown to black, artifact rich soils. Of note is a human effigy ceramic pipe bowl that was recovered from the ramped entrance at the interface between an infill layer and the basal layer.

Image 3: Feature 31 Profile View

Feature 45

Feature 45 was appended to the east wall of House 5, and is the only SSL associated with this house (Map 5). The feature measured 300 cm in length, 225 cm in width, and 17 cm in depth. Poor preservation was noted in this portion of the site, with excavators suggesting that the shallow depth of Feature 45 could be the result of grading or deflation of the property. Significant rodent disturbance was documented in nearly half of the feature, causing further challenges regarding its archaeological context. It is possible the surface layer represents the basal layer of the SSL, which was described as a dark brown to black ashy loam with charcoal inclusions that measured 12 cm in depth. Layers associated with the rodent burrow were documented through and below the basal layer. If the basal layer has been correctly identified, then the layer immediately above likely represents Infill Layer 1, which has been commonly observed in the Redeemer SSLs as a yellow brown to light brown sandy subsoil with charcoal inclusions. Within the truncated Feature 45, Infill Layer 1 shows the same general characteristics as seen elsewhere on the site, though it measured only 5 cm in depth.

Feature 74

Feature 74 was appended to the west wall of House 4 at its north end (Map 4). The feature measured 287 cm, 385 cm in width, and was 40 cm in depth. Initial identification of the feature was focused on the ramped entrance. In fact, the upper infill layer within the body of the SSL was completely indistinguishable from the surrounding subsoil. Only cross-sectioning of the ramped entrance demonstrated the feature continued west. No perimeter posts were identified during excavation. The basal layer was a dark brown to black clay loam with ash and charcoal inclusions. In the ramped entrance, the basal layer extended above a grey ash layer, which suggests the ash layer was deposited prior to the use of the SSL. Infilling layers consisted of sandy subsoil, with no surficial refuse layers present within Feature 74.

Feature 79

Feature 79 was appended to the east wall of House 3 (Map 3). The feature measured 300 cm in length, 200 cm in width, and 64 cm in depth. Twenty posts were identified surrounding the feature. The west half of Feature 79 was impacted by Feature 133 (undetermined pit) and Feature 97 (storage pit), and so data for the ramped entrance of Feature 79 is absent. The basal layer was a grey sand with ash and charcoal inclusions that extended to a maximum depth of 7 cm. Several infilling events were then noted from the basal layer up, including lower layers of black and grey artifact-rich sandy loam and an upper layer of sterile sandy subsoil.

Feature 86

Feature 86 was appended to the north end of House 1, with the head and half of the body located within the house (Map 2). The feature measured 290 cm in length, 203 cm in width, and 65 cm in depth (Image 4). Evidence of posts for the north end of the longhouse were identified centrally within the feature at its lowest level, though it remains unknown whether the wall post was removed prior to the construction of the SSL, or if the post was incorporated into the SSL structure. Four perimeter posts were noted including three within the house near the head and shoulder of the feature, and one located outside of the house. The basal layer was a dark brown loam with ash and charcoal deposits that extended to a maximum depth of 7 cm. Several infilling events were then noted from the basal layer up, alternating between light brown to yellow brown subsoil and dark brown to black, artifact rich soils.

Image 4: Feature 86 Plan View

Feature 104

Feature 104 was appended to the east wall of House 4, centrally along the structure (Map 4). The feature measured 340 cm in length, 225 cm in width, and 65 cm in depth. No perimeter posts were observed. The basal layer was a grey sandy loam with ash deposits over a thin black sandy loam with charcoal deposits that together measured 7 cm in depth. Several infilling events were then noted from the basal layer up, alternating between dark brown, artifact-rich soils and soil layers comprised of yellow brown subsoil with fewer artifacts. Fire-cracked rock was noted within several of the layers. Of note was a construction layer comprised of medium brown sand that extended around the circumference of the feature, and which was observed at the base of the ramped entranceway.

Feature 112

Feature 112 was in the northwest quadrant of the village and was not associated with a longhouse (Map 2). The feature measured 258 cm in length, 190 cm in length, and 28 cm in depth (Image 5). Excavation did not reveal any perimeter posts associated with this feature. Given the

complete lack of other documented features in this area, it is possible that deflation of this portion of the site occurred, leaving only the bottom half of Feature 112 observable within the subsoil. The basal layer was a dark brown sandy loam that measured 10 cm in depth. Several infilling events were then noted from the basal layer up, including a lower infill layer of yellow brown sandy subsoil and an upper refuse layer of dark brown, artifact-rich soil. Significant rodent disturbance was noted in the east half of the feature.

Image 5: Feature 112 Plan View

Feature 120

Feature 120 was located next to the east wall of the Northwest House, and was likely appended to that house (Map 6). The feature measured 360 cm in length, 250 cm in width, and 85 cm in depth. Excavation did not reveal any perimeter posts associated with this feature. The basal layer was a dark grey to black ashy sand with charcoal inclusions that measured 8 cm in depth. Below the basal layer was a light brown sand layer measuring 6 cm in depth, the function of which is unknown. Several infilling events were then noted from the basal layer up, alternating between light to medium grey brown soil and dark grey to black artifact rich soil. A band of sterile, light brown sandy soil formed a ring around the north and east sides of the feature, which was likely part of a construction trench.

Feature 134

Feature 134 was appended to the north wall of the West House, though settlement patterns for this house are unclear (i.e. the SSL may have been located within the house) (Map 6). The feature measured 380 cm in length, 220 cm in width, and 60 cm in depth (Image 6). Excavation did not reveal any perimeter posts associated with this feature. The basal layer was a dark grey to brown ashy sand with charcoal inclusions that measured 9 cm in depth. Several infilling events were then noted from the basal layer up, alternating between layers of light brown to yellow brown sandy loam with ash and charcoal inclusions and layers of dark brown to black sandy loam with charcoal and ash inclusions. Of note is a construction layer located in the ramped entrance of the SSL below the basal layer. This layer was a light brown sandy loam with charcoal inclusions, measured 10 cm in depth, and contained a bone bracelet.

Image 6: Feature 134 Profile View

Feature 135

Feature 135 may be appended to the north wall of the circular East House, though settlement patterns for this house, and the area in general, remain unclear (Map 5, Image 7). The feature measured 335 cm in length, 226 cm in width, and 83 cm in depth. Excavation of the lowest level of the pit revealed five perimeter posts represented by circular charcoal deposits. The basal layer was a dark grey sandy loam with ash and charcoal inclusions that measured 5 cm in depth. Below the basal layer was a hard, sterile red brown sand layer measuring 4 cm in depth. Several infilling events were then noted from the basal layer up alternating between layers of thick, light

brown to yellow brown sandy loam and thin, black to grey brown sandy loam with ash and charcoal inclusions. Of note is an *in-situ* ring of stones that was encountered at the surface of the basal layer, which included fire-cracked rocks and hardened ash deposits.

Image 7: Feature 135 Plan View

Feature 140

Feature 140 may be associated with a possible East structure located north of the circular East House (Map 5). Settlement patterns are unclear in this area, making it difficult to suggest a structural association. The feature measured 280 cm in length, 195 cm in width, and 55cm in depth. No evidence of perimeter posts was encountered. The basal layer was a dark grey ashy sand with charcoal inclusions and measured 8 cm in depth. Below the basal layer was a sterile yellow sand measuring 10 cm in depth, which separated the basal layer from the hard, sterile red brown sand layer below. Several infilling events were then noted from the basal layer up, alternating between thick, light brown to yellow brown sandy subsoil and thin grey brown sandy loam layers. A black refuse layer was observed on the surface of the feature.

Feature 141

Feature 141 is immediately adjacent to Feature 140 and may be associated with a possible East structure located north of the circular East House (Map 5). Settlement patterns are unclear in this area, making it difficult to confirm a structural association. The feature measured 300 cm in length, 220 cm in width, and 38 cm in depth. No evidence of perimeter posts was encountered.

The basal layer was a medium grey sandy loam with ash and charcoal inclusions that measured 3 cm in depth, though was thicker (16 cm) in the ramped entrance of the SSL. Below the basal layer was a sterile yellow sand measuring 3 cm in depth, which separated the basal layer from the hard, sterile red brown sand layer below. Several infilling events were then noted from the basal layer up, primarily comprised of red brown to yellow brown sandy subsoil below a dark grey to dark brown sandy loam refuse layer. Rodent disturbance was noted in the east half of the feature.

Feature 169

Feature 169 was appended centrally to the east wall in House 4 (Map 4). The feature measured 300 cm in length, 258 cm in width, and 52 cm in depth (Image 8). No perimeter posts were encountered. The basal layer was a grey to black sandy loam with ash and charcoal inclusions that measured 3 cm in depth in the body of the SSL. This layer was significantly thicker in the ramped entrance, ranging from 6 to 14 cm in depth. Several infilling events were then noted from the basal layer up, alternating between soil layers comprised of yellow brown subsoil with fewer artifacts and thin, dark brown, artifact-rich soils with higher artifact concentrations.

Image 8: Feature 169 Plan View

Feature 183

Feature 183 was located within the east bunk line of House 3, with the entrance from the northwest (Map 3). It was immediately adjacent to two other SSLs: Feature 186 and Feature 232. The feature measured 375 cm in length, 178 cm in width, and 68 cm in depth. Perimeter posts were

encountered around the southwest edge of the feature, although may have also been utilized as support posts along the bunk line of the longhouse, given their diameter. The basal layer was a grey to black sandy loam with ash and charcoal inclusions that measured 9 cm in depth. Several infilling events were then noted from the basal layer up, alternating between soil layers comprised of yellow brown subsoil and thin, dark brown or black soils. Two discrete pockets of ash and fire-reddened soil were encountered in the feature, with one thin deposit located immediately above the basal layer in the west half of the feature, and the other thicker deposit located immediately below the upper refuse layers in the west half of the feature. Chunks of lime were located within the infill layers in the west half of the feature.

Feature 186

Feature 186 was appended to the east of wall House 3, immediately adjacent to Feature 183 and Feature 232 (Map 3). The feature measured 214 cm in length, 192 cm in width, and 48 cm in depth. One perimeter post was encountered in the southeast corner of the feature. The basal layer was grey with significant ash deposits that measured 9 cm in depth. In the northwest quadrant, a circular depression was noted measuring 40 cm in diameter and 13 cm in depth. Several infilling events were then noted from the basal layer up, alternating between soil layers comprised of yellow brown subsoil with fewer artifacts and dark brown or black, artifact-rich soils with higher artifact concentrations.

Feature 206

Feature 206 was appended to the west wall of House 4 (Map 4). The feature measured 310 cm in length, 230 cm in width, and 80 cm in depth (Image 9). Ten perimeter posts were encountered surrounding the feature. The basal layer was a dark black and grey sandy loam with significant ash and charcoal deposits that measured 4 cm in depth. Several infilling events were then noted from the basal layer up, alternating between soil layers comprised of dark brown or black, artifact-rich soils and yellow brown to light medium brown subsoil with fewer artifacts.

Image 9: Feature 206 Plan View

Feature 207

Feature 207 was appended to the east wall of House 3 (Map 3). The feature measured 401 cm in length, 225 cm in width, and 70 cm in depth. No perimeter posts were encountered during the excavation of this feature. The basal layer was a dark brown and grey silt loam with significant ash and charcoal deposits that measured 7 cm in depth. Several infilling events were then noted from the basal layer up, alternating between soil layers comprised of medium brown, artifact rich soils and yellow brown to light medium brown subsoil with fewer artifacts. Feature 207 cuts into Feature 227, another SSL located along the east bunk line of House 3. Feature 207 clearly postdates the infilling of Feature 227. A nearly complete and intact turtle shell was located immediately below the ramped entrance of Feature 207, at the bottom of Feature 227.

Feature 214

Feature 214 was located within the east bunk line of House 3 (Map 3). The feature measured 424 cm in length, 184 cm in width, and 70 cm in depth, and eight perimeter posts were observed. Excavation revealed that Feature 214 was cut into Feature 218, an adjacent SSL that was appended to the east wall of House 3. The construction of Feature 214 destroyed the ramped entrance into Feature 218 and therefore must have postdated it. Feature 214 was unique in several ways. The SSL possessed two entrance ramps, with access to the pit from both the north and the south. Feature 214 also exhibited three distinct basal layers, separated by yellow brown sandy loam soil, suggesting three different periods of use. The lowest basal layer was a medium grey sandy

ash with charcoal inclusions that measured 3 cm in depth. The middle basal layer was a dark grey sandy loam with charcoal and ash inclusions, along with significant quantities of fire-cracked rock, and measured 6 cm in depth. Finally, the upper basal layer was a dark grey sandy loam with ash and charcoal inclusions that measured 2 cm in depth, though it was significantly deeper within the south ramped entrance (~ 10 cm). Several infilling events were then noted from the basal layer up, alternating between soil layers comprised of medium brown, artifact-rich soils and yellow brown to light medium brown subsoil with fewer artifacts.

Feature 218

Feature 218 was appended to east wall House 3 (Map 3). The feature measured 246 cm in length, 234 cm in width, and 68 cm in depth. Five perimeter posts were encountered during the excavation of this feature. As noted, the ramped entrance to Feature 218 was destroyed by the construction of Feature 14. While the Stage 4 excavation report indicates Feature 218 functioned as a storage pit, all the field notes consistently refer to the feature as a SSL. The basal layer was a dark brown and grey silt loam with significant ash and charcoal deposits that measured 7 cm in depth. Several infilling events were then noted from the basal layer up, alternating between yellow brown to light medium brown subsoil layers and soil layers comprised of medium brown, artifact rich soils.

Feature 220

Feature 220 was appended to the west wall of House 3 (Map 3). The feature measured 405 cm in length, 300 cm in width, and 76 cm in depth (Image 10). Twelve perimeter posts were encountered during the excavation of this feature. The basal layer was a dark brown to black sandy loam with significant ash and charcoal inclusions that measured 5 cm in three artifact-rich, grey to dark brown deposits. The primary infill layer, comprised of a light brown sandy loam, extended over the ramped entrance deposits, suggesting the ramped entrance was infilled first. A dark brown sandy loam layer was noted above the main infill layer, followed by a sterile yellow sand and the commonly occurring surficial refuse layer.

Image 10: Feature 220 Plan View

Feature 227

Feature 227 was located within the east bunk line of House 3 (Map 3). The feature measured 210 cm in length, 152 cm in width, and 46 cm in depth, and no perimeter posts were observed. The excavators were initially unsure of how to categorize this feature in terms of function due in part to the problematic stratigraphy. Feature 227 was cut into by Feature 207, and has significant rodent disturbance along the south edge where it was initially believed the ramped entrance was located. The excavators eventually concluded the feature served as a storage pit. However, re-interpretation of this feature as a SSL was based on the presence of the basal layer, which was noted as a dark brown and grey sandy loam with significant ash and charcoal deposits that measured 4 cm in depth. Basal layers were not present in storage pits at Redeemer. Additionally, the primary fill layer was comprised of medium to light brown soil with few artifacts, similar to the other SSLs at Redeemer. Finally, the pit was underlain by a sterile red brown sand layer, which was only noted as being present at the bottom of several SSLs at the site, and not storage pits. It is possible that the ramped entrance to Feature 227 was destroyed by the rodent burrow. Of interest is a complete and intact turtle shell that was located on top of the basal layer of Feature 227, immediately below the ramped entrance of Feature 207.

Feature 228

Feature 228 was located within the east bunk line of the West House (Map 6). The feature measured 244 cm in length, 184 cm in width, and 43 cm in depth. No perimeter posts were encountered during the excavation of this feature. Preservation at the West House was poor compared to elsewhere on the site, and it is possible this structure was not in use for a significant length of time. Feature 228 supports this theory. The SSL was shallow, contained few artifacts, and lacked a surficial refuse layer commonly noted on other SSLs at the site. The basal layer was a black sandy loam with significant ash and charcoal deposits that measured 6 cm in depth. Only a single infilling event was noted above the basal layer and consisted of a light brown subsoil containing few artifacts. Surficial lenses of black and fire reddened soil were noted on the surface of the infill layer; however, the boundaries were diffuse, and depths were shallow.

Feature 229

Feature 229 was located within the west bunk line of House 3 (Map 3). The feature measured 296 cm in length, 191 cm in width, and 69 cm in depth (Image 11). No perimeter posts were encountered during the excavation of this feature. The basal layer was a dark brown to black sandy loam with significant ash and charcoal deposits that measured 10 cm in depth. Several infilling events were noted from the basal layer up, alternating between light brown subsoil and a dark brown to black, artifact-rich sandy loam. Of note was an orange to yellow sandy loam construction layer encountered below the basal layer, and which was underlain by a red brown sand common to SSLs across the site. Within the yellow sandy loam construction layer was a pocket of black sandy loam containing significant charcoal inclusions. No artifacts were recovered from this pocket.

Image 11: Feature 229 Plan View

Feature 232

Feature 232 was appended to the east wall of House 3 (Map 3). The feature measured 328 cm in length, 298 cm in width, and 68 cm in depth, and 15 perimeter posts were documented. This SSL exhibited two ramped entrances, with Ramp 1 oriented north with access from outside of the house and Ramp 2 located through the east wall of House 3. Care was taken during excavation to attempt to identify the construction sequence for this pit. Ramp 2 was well established and presented a gradual slope with the basal layer extending up the ramp. The basal layer was located across the bottom of the feature and was a grey sandy loam with charcoal and ash inclusions that measured 5 cm in depth. Ramp 1 was shallower and contained no evidence of the basal layer, suggesting it was in use some time after, or near the end, of the main use of the SSL. Ramp 1 was also located immediately adjacent to F186, another SSL, the location of which would have caused limited access to the ramp, suggesting Ramp 1 was not in use at the same time as F186. Several infilling events were noted from the basal layer up, alternating between light brown subsoil and a dark brown to black, artifact-rich sandy loam. The soil layers were similar in colour and consistency, many of which present diffuse borders with adjacent layers. Given the presence of

the upper infill layers in both Ramp 1, Ramp 2, and the body of the SSL, it seems likely both ramps were at least filled in at the same time.

Feature 237

Feature 237 was not associated with a house, but rather was located between House 2 and House 3 (Map 2). The feature measured 332 cm in length, 204 cm in width, and 72 cm in depth (Image 12). No perimeter posts were encountered during the excavation of this feature. The basal layer was a dark grey ash layer with significant charcoal deposits that measured 18 cm in depth, which is unusually thick for the SSLs at Redeemer. Several infilling events were noted from the basal layer up, alternating between light brown subsoil and a dark brown to black, artifact-rich sandy loam. Interestingly, no evidence of a surficial refuse layer was present. Of note was a sterile orange to yellow sandy loam construction layer encountered below the basal layer, and which was underlain by a red brown sand common to SSLs across the site.

Image 12: Feature 237 Plan View

Feature 245

Feature 245 was located within the central corridor of House 3 (Map 3). The feature measured 428 cm in length, 348 cm in width, and 68 cm in depth (Image 13). Five perimeter posts were encountered during the excavation of this feature. The basal layer was a dark grey to black sandy loam with significant ash and charcoal inclusions that measured 6 cm in depth. Several infilling events were noted from the basal layer up, including a primary infill layer comprised of light brown subsoil, and a dark brown to black, artifact-rich sandy loam. Two surficial refuse layers were also noted. Feature 245 is one of the largest SSLs at Redeemer and is one of the few to be located along the central corridor of a longhouse.

Image 13: Feature 245 Profile View

Feature 247

Feature 247 was appended to the west wall of House 1 (Map 2). The feature measured 370 cm in length, 223 cm in width, and 80 cm in depth, with only a single perimeter post identified. The basal layer was a dark grey to black ashy sandy loam with significant ash and charcoal inclusions that measured 7 cm in depth. Several infilling events were noted from the basal layer up, including a primary infill layer comprised of light brown subsoil, and a dark brown to black, artifact-rich sandy loam. Additional pockets of infill were located within the centre of the feature above the basal layer and within the ramped entrance. Two surficial refuse layers were also noted, as was an area of modern disturbance that was identified based on the presence of plastic and other

modern debris within the soil matrix. A light-yellow subsoil layer was noted below the basal layer. While this layer was sterile, its presence above the red sandy subsoil common to this part of the site suggests it was placed during the construction of the SSL.

Feature 248

Feature 248 was appended to the east wall of House 1 (Map 2). The feature measured 346 cm in length, 244 cm in width, and 81 cm in depth (Image 14). Seven perimeter posts were encountered during the excavation of this feature. Two basal layers were present, separated by a thin, sterile layer of yellow sandy subsoil. The lower basal layer was very dark grey silt loam with significant ash and charcoal inclusions that measured 7 cm in depth. The upper basal layer was a medium grey silt loam with significant ash and charcoal inclusions that measured 6 cm in depth. Several infilling events were noted from the basal layer up, alternating between thick layers of light yellow brown subsoil, and thinner, dark brown to black, artifact-rich layers. Two surficial refuse layers were also noted. As with Feature 247, a light-yellow sandy layer that was sterile was noted below the basal layer, located above the surrounding red sandy subsoil.

Image 14: Feature 248 Profile View

Feature 250

Feature 250 was appended to the west wall of House 3 (Map 3). The feature measured 362 cm in length, 234 cm in width, and 68 cm in depth (Image 15). No perimeter posts were encountered during the excavation of this feature. The basal layer was a medium to dark grey ashy

layer with significant ash and charcoal inclusions that measured 3 cm in depth. One primary infilling event was noted above the basal layer and is described as a thick layer of light brown to yellow brown subsoil. The ramped entrance also contained a thick ash deposit above this infill layer, and pockets of fire-reddened soil throughout the feature. Two surficial refuse layers were also noted, though the upper layer is likely remnant topsoil. Similar to Features 247 and 248, a light-yellow sand was found below the basal layer, and above the red sandy subsoil.

Image 15: Feature 250 Plan View

Feature 251

Feature 251 was appended to the east wall of House 2 (Map 2). The feature measured 362 cm in length, 200 cm in width, and 80 cm in depth. Two perimeter posts were encountered during the excavation of this feature. The basal layer was a light to medium grey ashy layer with significant charcoal inclusions that measured 20 cm in depth. Several infilling events were noted above the basal layer, alternating light brown to yellow brown subsoil, and dark brown sandy loam layers. Two surficial refuse layers were also noted.

Feature 256

Feature 256 was appended to the west wall of House 3 (Map 3). The feature measured 308 cm in length, 220 cm in width, and 71 cm in depth. No perimeter posts were encountered during

the excavation of this feature. The basal layer was a medium grey ashy layer with significant charcoal inclusions that measured that measured 3 cm in depth. Several infilling events was noted above the basal layer, with a lower layer of dark grey sandy loam with charcoal inclusions, and two sandy subsoil-like layers above. No surficial refuse layers were present, leaving the surface of the feature nearly indistinguishable from the surrounding subsoil.

Feature 257

Feature 257 was located within the central corridor of House 2 (Map 2). The feature measured 382cm in length, 248 cm in width, and 52 cm in depth (Image 16). No perimeter posts were encountered during the excavation of this feature. The basal layer was a light grey ashy layer with significant charcoal inclusions that measured that measured 7 cm in depth. Several infilling events were then noted above the basal layer. Within the ramped entrance, two artifact-rich, grey to dark brown deposits were identified. The primary infill layer in the body of the SSL, comprised of a medium light brown sandy loam, extended over the ramped entrance deposits, suggested the ramped entrance was infilled first. The presence of several unique artifacts within the ramped entrance suggests some significance to the infilling process at Feature 257. Two surficial refuse layers were also noted.

Image 16: Feature 257 Plan View

4.2 SSL Spatial Characteristics

4.2.1 Location

At Redeemer, SSLs are either associated with a house (32) or are in an isolated position located external to a house (4). Table 7 details the number and frequency of SSLs across the site by house, and includes SSLs located external to a house as a separate group. Unfortunately, due to poor settlement pattern data, it is difficult to make between-house comparisons. Only House 3 and House 4 are relatively complete, demonstrating house lengths that are consistent with average house lengths observed in the Middle Ontario Iroquoian period (~38 m) (Dodd 1984; Crease 2012). The other houses have notably incomplete patterns, and it is unknown how many more SSLs, if any, were associated with these houses during village occupation. Settlement pattern data is particularly poor for the East and South Houses, making it impossible to conclusively determine whether either is the remnant of a longhouse. However, based on the available data, every house appears to have at least one SSL, which suggests their use was commonplace by each longhouse membership within the village. Over one-third of all SSLs were associated with House 3, making this a rather unique house within the village. The remaining SSLs are distributed relatively evenly across the site, ranging between one and four per house.

Table 7: SSLs by Location

Location	#	%
House 1	3	8.3
House 2	2	5.6
House 3	13	36.1
House 4	4	11.1
House 5	1	2.8
Northwest House	1	2.8
West House	2	5.6
East House	3	8.3
South House	3	8.3
External to a House	4	13.9
Total	**36**	**100.0**

Despite the limitations of this dataset, various analyses were conducted with the available data, and are reported on in Section 4.3 and Section 4.4. Regarding location, the percentage of space occupied by SSLs for each house living space area were calculated to identify variations

between houses. House and SSL area was calculated via spatial GIS software, and is displayed in Table 8. Calculations for the East House and South House were not completed due to the poor settlement patterns. Of the observable living space in the remaining houses, House 3 stands out as being particularly unusual, with 21.8% of living space devoted to SSLs. Comparisons of the percentage of SSL area to house living space area are made between the Redeemer site and other sites in southern Ontario in Chapter 5.0.

Table 8: SSLs to Living Area Ratios

House	House Living Area (m^2)	# SSLs	SSL Area (m^2)	% of House Area Taken Up by SSL
House 1	110	3	15.5	14.1
House 2	110	2	12.9	11.7
House 3	309	13	67.3	21.8
House 4	370	4	18.7	5.1
House 5	225	1	4.3	1.9
Northwest House	51	1	3.6	7.1
West House	75	2	8.8	11.7
East House	n/a	3	n/a	n/a
South House	n/a	3	n/a	n/a

An examination of which SSLs could have been contemporaneous can assist with understanding the spatial dynamics of House 3, the only house where SSLs intersect with one another (Map 3). Two cases are present where SSLs intersect and make it possible to determine their sequence of construction. The first case is Feature 207 and Feature 227, with the former being appended to the east wall of the longhouse, and the latter being located within the east bunk line. Feature 207 cuts into Feature 227, indicating it was constructed following the abandonment of Feature 227. The second example involves Feature 214 and Feature 218. Feature 218 is appended to the east longhouse wall while Feature 214 is located within the east bunk line. For this pair, the ramped entrance of Feature 218 was destroyed by the construction of Feature 214, indicating Feature 218 was built prior to Feature 214. Even removing two SSLs representing later construction events, a significant portion of the House 3 living space was still devoted to SSLs when compared to the other houses at Redeemer.

Finally, current information about SSLs that are not located within or attached to houses are virtually absent in the literature. As such, Redeemer offers a unique opportunity to examine four SSLs that are not associated with longhouses, which are in four very distinct parts of the village. Feature 112 is located equidistant between the north end of House 1 and the north palisade wall, with the ramped entrance to the south (Map 2). Feature 237 is located between House 2 and House 3, with the ramped entrance to the north (Map 2). Feature 31 is in the south half of the village where settlement patterns are unclear (Map 7). The feature appears to be situated generally south of House 2, and north of the south palisade wall. The entrance to the ramped entrance was from the north. Feature 24 is located outside of the village as denoted by the palisade (Map 7). Situated south of the south palisade wall, the entrance to the SSL is from the south. External SSLs are compared as a group against SSL morphological attributes in Section 4.3 and against artifact distributions in Section 4.4, aimed at identifying any trends that might be present as they relate to SSLs that are not associated with houses.

4.2.2 Alignment

At Redeemer, SSLs associated with houses (32) were classified further by alignment. SSLs were either appended to a longhouse wall (20), aligned with the bunk line (7), located within the central corridor (2), or in an unknown location due to poor settlement pattern data (3) (Table 9). In areas of the site with poor settlement pattern data, alignment could not be reliably determined. For example, patterns at the East House are extremely unclear. As previously noted, the East House may in fact represent two structures. While it seems clear that Feature 135 is appended to a house wall, the alignments of Feature 140 and Feature 141 are unknown. In the South House, Feature 18 was severely impacted by rodent disturbance. Based on the observed data, it seems possible that the SSL could have been located within the central corridor or within a bunk line, of the South House. As a result, three SSLs have an unknown alignment.

Table 9: Number and Frequency of SSLs by Alignment

Alignment	#	%
Appended	20	62.5
Bunk Line	7	21.9
Central Corridor	2	6.2
Unknown	3	9.4
Total	**32**	**100.0**

Most frequent are SSLs that are appended to a wall, accounting for 62.5% of SSLs associated with houses. SSLs located within the bunk line are the next most common, accounting for 21.9%, followed by SSLs located along the central corridor (6.2%). In the following sections, alignment is used as a categorical variable against which SSL morphological attributes (such as length, width, and depth) (Section 4.3) and artifact distributions (Section 4.4) are measured. Statistical analyses were aimed at identifying whether there are trends in SSLs at Redeemer related to alignment.

Limited observations on the alignments of SSLs that are not associated with houses can still be made, if cardinal directions are considered. Of the four external SSLs, Feature 31, Feature 112, and Feature 237 are aligned to roughly the same northwest-southeast axis, similar to the layout of the longhouses. Feature 24, located outside of the palisade wall, is oriented in a more southerly direction, a distinctly different alignment when compared to the other Redeemer SSLs. In the following sections, where warranted, SSLs located external to a house are considered as a group when comparing alignment to other attributes.

4.2.3 Bilateral Symmetry

Related to alignment is the obvious bilateral symmetry of SSLs that are appended to the longhouse, or along the bunk line. MacDonald and Williamson (2001) have noted that while the bilateral symmetry of SSLs appears to be purposeful in southern Ontario given the number of occurrences documented in reports, it does not appear to be as consistent as one might expect if it were part of a prescribed design. MacDonald and Williamson (2001) suggested that if bilateral symmetry in SSLs was purposeful, it might be related to the dualism common in Iroquoian sacred ideology. Such dualism can be viewed in the organization of interior space within the longhouse. In his study of Northern Iroquoian longhouses and personhood, Creese (2012) concluded that the dual family pattern along centrally located hearths had become an established organizational pattern within the longhouse by the mid-12th century. Paired oppositions in SSL location was also noted, and Creese (2012) theorized that when SSL bilateral symmetry was present, it could signify that SSL construction was coordinated by the two families who shared a centrally located hearth. Alternatively, the appearance of bilateral symmetry may simply be the result of each family on either side of the shared hearth constructing their own SSL. While not consistently present within

all longhouses at the Redeemer site, the frequent occurrence of bilateral symmetry suggests the design is indicative of some common community practice.

Bilateral symmetry is evident at four houses: House 1, House 3, House 4, and the South House. At House 1, Feature 247 is appended to the west wall and Feature 248 is located on the opposite side of the house, appended to the east wall (Map 2). The two SSLs are/were organized around a centrally located hearth. At House 3, there are four instances of bilateral symmetry (Map 3). Feature 220 is appended to the west wall and Feature 207 is located on the opposite side of the house, appended to the east wall. Feature 250 is appended to the west wall and Feature 186 is located on the opposite side of the house, appended to the east wall. Feature 229 is located along the west bunk line with the entrance from the north, and Feature 183 is located on the opposite side of the house, along the east bunk line with the entrance from the north. Finally, Feature 256 is appended to the west wall and Feature 218 is located on the opposite side of the house, appended to the east wall. At House 4 there is a single instance of bilateral symmetry, with Feature 206 appended to the west wall and Feature 169 located on the opposite side of the house, appended to the east wall (Map 4). At the South House, Feature 3 is appended to the west wall and Feature 23 is located on the opposite side of the house, appended to the east wall, though the paired SSLs do not line up completely (Map 7). While bilateral symmetry is not present for all houses, paired SSLs appears to be a relatively common organization within the village, and particularly at House 3. Coordination of SSL construction by families could potentially signify a shared purpose between families with respect to sweat bathing practices or may simply reflect each family's need for their own SSL.

4.3 SSL Morphological Characteristics

4.3.1 Dimensional Attributes

4.3.1.1 Descriptive Statistics

Descriptive statistics were completed for total SSL length, SSL width, SSL depth, SSL body length, and ramped entrance length, width, and depth. Tests of normality were conducted to identify whether distributions of the attributes approximated normal. In some cases, ramped

entrance data was not present due to disturbance (rodent or human), and so several SSLs were excluded from the analysis. The results are presented in Table 10.

Table 10: SSL Dimensional Attributes – Descriptive Statistics (measurements in cm)

Attribute (cm)	N	Min	Max	Mean	Std. Deviation	Interquartile Ranges 25	50	75
Total SSL Length	36	190	433	329.22	59.17	300	340	377
SSL Width	36	85	385	219.69	46.37	202	220	230
SSL Depth	36	17	87	62.94	16.06	55	68	74
SSL Body Length	34	141	328	244.53	44.13	218	242	279
Ramped Entrance Length	34	49	140	90.65	22.06	74	90	104
Ramped Entrance Width	34	36	120	74.44	19.66	60	74	90
Ramped Entrance Depth	33	16	72	48.73	15.89	38	52	60

Tests of normality demonstrated that while total SSL length, body length, ramped entrance length, and ramped entrance width followed a normal distribution, the SSL width, depth, and ramped entrance depth did not. As a result, nonparametric tests were completed for the latter category wherever possible.

4.3.1.2 Dimensional Attributes of SSLs

To assess whether any of the dimensional attributes were correlated, Pearson's correlations were generated for attributes with normal distributions and Spearman's *rho* was utilized when normality was violated. Table 11 displays the attributes with positive correlations.

Table 11: SSL Dimensional Attributes - Positive Correlations at 0.01 and 0.05 Levels

Attribute 1	Attribute 2	Correlation	Significance (2-tailed)
Total SSL Length	SSL Width	Spearman's rho=.408	p=0.014*
Total SSL Length	SSL Depth*	Spearman's rho=.477	p=0.003**
Total SSL Length	Body Length	Pearson's r=.925	p=.000**
Total SSL Length	Ramped Entrance Length	Pearson's r=.648	p=.000**
Total SSL Length	Ramped Entrance Width	Pearson's r=.437	p=.010**
Total SSL Length	Ramped Entrance Depth	Spearman's rho=.435	p=.011*
SSL Body Length	SSL Width	Spearman's rho=.401	p=.019*
SSL Body Length	SSL Depth	Spearman's rho=.453	p=.007**
Ramped Entrance Length	Ramped Entrance Width	Pearson's r=.520	p=.002**
Ramped Entrance Width	Ramped Entrance Depth	Spearman's rho=.464	p=.007**

Attribute 1	Attribute 2	Correlation	Significance (2-tailed)
Ramped Entrance Depth	SSL Depth*	Spearman's rho=.775	p=.000**
** Correlation is significant at the 0.01 level (2-tailed) *Correlation is significant at the 0.05 level (2-tailed)			

Several attributes were highly correlated at the 0.01 significance level. For example, the hypothesis that deeper SSLs have longer total lengths (Spearman's rho=.477, p=.003) and longer body lengths (Spearman's rho=.453, p=.007) is supported. While total SSL length is strongly correlated with both the body length (Pearson's 4=.925, p=.000) and with the length of the ramped entrance (Pearson's r=.648, p=.000), the length of the ramped entrance is not correlated with the length of the SSL body at the 0.05 level (Pearson's r=.309, p=.076). However, longer ramped entrances tend to be wider (Pearson's r=.520, p=.002), and wider ramped entrances tend to be deeper (Spearman's rho=.464, p=.007). Finally, ramped entrance depth and SSL depth are strongly correlated (Spearman's rho-.775, p=.000).

4.3.1.3 Dimensional Attributes and Spatial Characteristics – Comparisons between SSLs located in Houses and SSLs located External to a House

With so little documentation on SSLs that are located external to houses, it was decided that statistical tests would also be completed to determine whether there were any differences in the dimensional attributes of SSLs located external to houses compared to those that were associated with houses. The analysis used to address this question was the independent samples Student's t-test for variables with a normal distribution and the Mann-Whitney for variables that did not meet the normality assumption. No differences were found for any of the dimensional attributes when comparing SSLs located in houses versus SSLs located external to houses. Similarly, the Mann-Whitney test was consistent with the results of the Student's t-test. No differences were found between SSLs located in houses compared to those located external to houses.

4.3.1.4 Dimensional Attributes and Spatial Characteristics – Comparison of SSLs between Houses

An assessment of whether there were any differences in dimensional attributes between SSLs located in different houses was completed. House 5 and the Northwest House were removed

from the dataset as they only provided a single observation, and observations from the East House were also removed as the settlement pattern data for this location was decidedly unclear. According to the one-way ANOVA, statistically significant differences were found between houses for body length (F=4.38, p=.008). According to the Kruskal-Wallis test, width (Chi-Square=9.900, p=.078) and depth (Chi-Square=9.641, p=.086) were significant only at a 0.1 level. While this result is not significant at the 0.05 level, it may suggest a trend in the data and so is further explored. Pairwise comparisons are examined below using an independent Student's t-test for attributes with a normal distribution and the Mann-Whitney test for attributes where normality was violated.

Body Length: Differences in body length were significant between House 1 and the South House. Specifically, House 1 SSLs (M=246 cm) had significantly longer bodies than SSLs in the South House (M=178 cm), with the difference being significant at the .05 level. House 2 had SSLs with the longest body length and were significantly longer than SSLs in House 4 (293 cm vs 221 cm, p=.043), the South House (293 cm vs 178 cm, p=.003), and the West House (293 cm vs 218 cm, p=.036). Finally, House 3 had SSLs with significantly longer bodies than the South House (270 cm vs 178 cm, p=.001) and the West House (270 cm vs 218 cm, p=.040).

Width: The Mann-Whitney test was used to compare pairs of houses. Significance at the 0.05 level was only identified for House 4 and the South House, and House 4 and the West House, though the remaining pairs were all close to the 0.05 level. Specifically, House 4 has the widest SSLs (M=289 cm) and the South House has the least wide SSLs (M=155 cm) (p=.050), and the West House SSLs are also significantly narrower than the SSLs in House 4 (198 cm vs 289 cm, p=.050).

Depth: The Mann-Whitney test was used to compare pairs of houses. Significance at the 0.057 level was only identified for House 3 and House 4 (67 cm vs 52 cm), suggesting a trend towards significance.

4.3.1.5 Dimensional Attributes and Spatial Characteristics – Comparison of Differently Aligned SSLs

To assess whether there were variations in dimensional attributes between differently aligned SSLs, a set of one-way ANOVAs was completed for variables with a normal distribution, and the Kruskal Wallis test was applied for the variables where the normality assumption was not met. Based on the one-way ANOVA results, there are no significant differences for any of the dimensional attributes between groups. Pairwise comparisons were also explored and demonstrate

that the differences for some pairs are significant at a 0.1 level. While this significance level is not strong, given the small sample size of this dataset and the exploratory nature of this research, it could still be indicative of a trend. SSLs that are appended have a shorter total length when compared to those that are in the central corridor (334 cm vs 405 cm, p=.091). SSLs located in the bunk line also have a shorter total length than those that are in the central corridor (318 cm vs 405 cm, p=.058). The SSL body length of appended SSLs is shorter when compared to SSLs located in the central corridor (244 cm vs 303 cm, p=.056). Finally, SSLs that are appended have less wide entrances compared to those in the central corridor (76 cm vs 99 cm, p=.078).

According to the Kruskal Wallis test, while there are no significant differences for SSL depth and ramped entrance depth between differently aligned SSLs, there is a trend towards significance in width (p=.053). The Mann-Whitney test was then used to test pairs and identify where the differences are occurring. Differences were found at the 0.1 significance level. Specifically, appended SSLs are wider when compared to SSLs located in the bunk line (p=.092), and SSLs in the central corridor are wider when compared to appended SSLs (p=.052).

4.3.1.6 Dimensional Attributes and Spatial Characteristics – Comparisons of Differently Aligned SSLs, between Houses

For the assessment of whether dimensional attributes vary between differently aligned SSLs, with house location included as an additional source of variation, a two-way ANOVA was applied. House 5 and the Northwest House were excluded since they only have one observation, and the East House was removed due to poor settlement data. The results of the two-way ANOVAs show that there were no significant differences between houses or alignment. However, depth was different at a 0.1 significance level (F=2.20, p=.099). Again, while this result does not reach the chosen 0.05 level of significance, given the small sample size it is worthwhile to note these variations since they may signify that certain trends exist in the data; this is important to note for future studies with larger sample sizes. Pairwise comparisons were then completed for the depth attribute and significant differences were found between several houses. House 1 and House 2 have the deepest SSLs, with both having a mean of 73 cm, and are each significantly deeper than SSLs from House 4 (M=50 cm) with p-values of .014 and .039, respectively. Additionally, House 3 (M=66 cm) has significantly deeper SSLs when compared to House 4 (p=.039).

While no statistical differences were found for most of the dimensional attributes, the effect sizes (measured by the partial eta squared) can help to understand whether there is more variation

between different houses or different alignments. For example, for the attribute SSL width, it appears that house location accounts for 34.1% of the variance in width while alignment accounts for approximately 10% of the variance in width. In examining Table 12, it appears that only total SSL length and ramped entrance length are more strongly influenced by alignment compared to house location, while the remaining attributes are more strongly influenced by house location, to varying degrees.

Table 12: SSL Dimensional Attributes – Partial Eta Squared for Variations between SSL House Location and Alignment

Attribute	Source	Partial Eta Squared
Total SSL Length	House	.078
	Alignment	.101
SSL Width	House	.341
	Alignment	.099
SSL Depth	House	.380
	Alignment	.022
SSL Body Length	House	.405
	Alignment	.056
Ramped Entrance Length	House	.224
	Alignment	.235
Ramped Entrance Width	House	.222
	Alignment	.117
Ramped Entrance Depth	House	.256
	Alignment	.004

4.3.1.7 Dimensional Attributes and Spatial Characteristics – Comparing House 3 SSLs to All Other SSLs

To assess the difference in the dimensional attributes between SSLs in House 3 versus SSLs in other houses, the Student's t-test and its nonparametric equivalent, the Mann-Whitney test, were applied. Results show that there are significant differences in body length between House 3 and the other houses, with House 3 SSLs being larger when considering mean body length (270.3cm vs 231.5cm, t=-2.421, p=.022). No differences were found for any of the other dimensional attributes.

4.3.2 Ramped Entrances

All but two SSLs at Redeemer had ramped entrances. The ramped entrance of Feature 218 was absent, having been destroyed by the construction of Feature 214. The ramped entrance of Feature 227 was destroyed by rodent disturbance. Of the remaining SSLs, statistical analyses were completed for length, width, and depth measurements, and demonstrated that while ramped entrance length follows a normal distribution, ramped entrance width and depth do not. Ramped entrance length has a mean of 90.65 cm, and ranges between 29 cm and 140 cm (Image 17). For ramped entrance width and depth, interquartile ranges are presented to better reflect the variation in these attributes. The mean width is 74.44 cm, with the middle 50% of width measurements being between 60 cm and 90 cm. The mean depth is 48.73 cm, with 50% of all depths being between 38 cm and 60 cm.

Image 17: Feature 3 Profile View – Ramped Entrance on Right

Profiles of the ramped entrances tend to fall into two categories: stepped and gently sloping. Seventeen ramped entrances presented a stepped profile, and 15 presented a gently sloping profile. Two SSLs had two ramped entrances each. Feature 214, located along the east bunk line of House 3, had a sloped entrance to the north, and a stepped entrance to the south. Feature 232, which was appended to the east wall of House 3, had stepped entrances to the north and west. Why this variation in entrance profile exists is unknown; it seems likely that sloped entrances would more easily facilitate entry into the body of the SSL via crawling, while a stepped entrance would facilitate entrance in standing position.

Investigations into the two SSLs with double ramped entrances were also completed to identify whether both were in use simultaneously, or if reconstruction occurred. For Feature 214, the north entrance was constructed following the disuse of the south entrance. Evidence of multiple basal layers was present, which allows for this determination. The lower basal layer extends partially up the south ramp and is absent in the north ramp. A filling episode of yellow sandy

subsoil is evident in the south half of the feature between two of the basal layers, with the upper basal layer extending partially up the north ramp, and above the infill layer in the south ramp. For Feature 232, stratigraphy is less clear, and is poorly documented for the north entrance. Consequently, no conclusions can be drawn regarding the construction events of Feature 232.

4.3.3 Perimeter Posts

Perimeter posts are a commonly cited attribute of SSLs, believed to provide support for the superstructure and its covering. Posts tend to be located either around the perimeter of the feature, visible at the topsoil/subsoil interface, or at the bottom of the SSL below the basal layer. At Redeemer, perimeter posts were observed for 20 SSLs, accounting for 55.6% of SSLs at the site. This number is relatively low when compared against SSLs from other sites (see Chapter 5.0). Table 13 presents the presence and absence of perimeter posts by SSL location and alignment and demonstrates there is a relatively even of distribution of SSLs with perimeter posts versus those without. As a result, it seems unlikely that location within the village, or SSL alignment, is a determining factor in whether perimeter posts were encountered. Possible reasons for not encountering perimeter posts on the remaining SSLs might include excavator error, or a lack of posts being used for the construction of the superstructure. Where excavator error is concerned, posts may have been impossible to identify if they never extended to the basal layer and were removed prior to the disuse of the SSL. Site deflation might account for difficulties in identifying perimeter posts at the topsoil/subsoil interface. It is also possible that the posts were not always set into the soil, with posts being set into a teepee-like structure on the surface.

Table 13: SSLs and Perimeter Posts by Location and Alignment

Location	Present				Absent					Total
	Appended	Bunk Line	Central Corridor	External to House	Appended	Bunk Line	Central Corridor	Unknown	External to House	
House 1	3									3
House 2	1						1			2
House 3	4	4	1		3	1				13
House 4	2				2					4

Location	Present				Absent					Total
	Appended	Bunk Line	Central Corridor	External to House	Appended	Bunk Line	Central Corridor	Unknown	External to House	
House 5	1									1
Northwest House					1					1
West House					1	1				2
East House	1							2		3
South House	1				1			1		3
External to House				2					2	4
Total	**13**	**4**	**1**	**2**	**8**	**2**	**1**	**3**	**2**	**36**

Of the observed SSLs with perimeter posts, most had posts that were encountered near the bottom of the SSL, or below the basal layer. Feature 31 is the only exception. A row of posts was documented along the west edge of the feature, with a single post encountered on its eastern periphery. Feature 31 is not associated with a house but appears to be located within a fenced area in the south half of the site. Settlement patterns are poor for this area due to the construction of an access road immediately to the north, making further observations impossible.

Two other SSLs are of note. The excavation of Feature 3 (Image 18) and Feature 24 revealed well preserved perimeter posts at the bottom of the SSLs. In both instances, a continuous dark line of soil was observed consisting of a relatively thin, dark brown or black line of soil that ran continuously between the posts. There were several discrete lines stacked on top of each other. This darker soil was interpreted as the remnants of strips of organic material woven between *and at least sometimes* around alternate sides of the posts, in a woven style of construction for the superstructure. In the case of these two SSLs, it seems likely that the covering extended to the bottom of the SSL, rather than being erected from the surface of the ground.

Image 18: Feature 3 Perimeter Posts

4.3.4 Basal Layers

4.3.4.1 Descriptive Statistics

Descriptive statistics were completed for basal layer thickness measurements, and tests of normality were conducted to identify whether a normal distribution was present. In some cases, basal layer thickness data was not present due to disturbance (rodent or human), and so several SSLs were excluded from the analysis. The results are presented in Table 14 and demonstrate that 50% of SSLs have a basal layer thickness that ranges between 5 cm and 9 cm, with the median being 7 cm.

Table 14: Basal Layer Thickness – Descriptive Statistics

Attribute (cm)	N	Min	Max	Mean	Std. Deviation	Interquartile Ranges 25	50	75
Basal Layer Thickness	34	3	20	7.57	3.818	5.0	7.0	9.0

Tests of normality demonstrated that basal layer thickness does not follow a normal distribution. As a result, nonparametric tests were completed for the basal layer thickness statistical testing wherever possible.

4.3.4.2 Basal Layer Thickness and SSL Depth

To assess whether basal layer thickness was correlated with SSL depth, the Spearman's correlations were generated. Results show there is no relationship between basal layer thickness and SSL depth (Spearman's rho=.063, p=.724).

4.3.4.3 Basal Layer Thickness and Spatial Characteristics – Comparisons between SSLs located in Houses and SSLs located External to a House

Statistical tests were completed to determine whether there were any differences in basal layer thickness between SSLs located external to houses compared to those that were associated with houses. The results of the Mann-Whitney test demonstrated that significant differences were found for basal layer thickness when comparing SSLs located in houses versus SSLs located external to houses (Mann-Whitney U=11, p=.005). SSLs not associated with houses had deeper basal layers (M=12.25 cm) when compared with those that are associated with houses (M=6.95 cm).

4.3.4.4 Basal Layer Thickness and Spatial Characteristics – Comparison of SSLs between Houses

To assess whether there were any differences in basal layer thickness between SSLs located in different houses, the Kruskal Wallis test was completed. According to the Kruskal Wallis test, there are no differences overall (Chi-Square=11.998, p=.101); however, the p-value is relatively low, and given the small sample size, might be indicative of a trend. Consequently, pairwise comparisons were explored to identify where these differences were occurring. Results demonstrated that there are statistically significant differences between SSLs in House 3 when compared to SSLs located external to houses, with SSLs external to a house having a thicker basal layer overall (Mann-Whitney U=3.5, p=.006).

4.3.4.5 Basal Layer Thickness and Spatial Characteristics – Comparison of Differently Aligned SSLs

To assess whether there were variations in basal layer thickness between differently aligned SSLs, the Kruskal Wallis test was applied, where basal layer thickness was the dependent variable and the alignment was the group variable. No differences were found in the depth of the basal layer between differently aligned SSLs.

4.3.4.6 Basal Layer Thickness and Spatial Characteristics – Comparisons of Differently Aligned SSLs between Houses

A two-way ANOVA was used to assess the variation in basal layer thickness across both house and alignment. House 5 and the Northwest House were excluded since they only had one observation each, and the East House was removed due to poor settlement data. First, the Levene's test of equality of variances was conducted and was not accepted, and as a result caution is advised in interpreting the results. The results of the two-way ANOVAs show that there are significant differences in basal layer thickness when considering house location and alignment. In this model, house location is a better predictor of the differences in basal layer thickness (F=3.03, Effect size=.46, p=.037) compared to alignment (F=1.601, Effect size=.015, p=.229).

An examination of the estimated marginal means and the corresponding pairwise comparisons demonstrates that the differences are found between House 2 and all other houses. More specifically, House 2 contains SSLs with the thickest basal layer overall compared to the South House which has the shallowest basal layers (14.3 cm vs 4.1 cm, p=.006), and followed by House 3 (14.3 cm vs 4.8 cm, p=.002), House 1 (14.3 cm vs 5.6 cm, p=.010), House 4 (14.3 cm vs 5.8 cm, p=.012), and the West House (14.3 cm vs 6.8 cm, p=.027). Again, caution is advised when interpreting these results given that two of the assumptions of the ANOVA are not met: the homogeneity of variances as indicated by the Levene's test (F-3.92, p=.009), and the normality of the dependent variable.

4.3.5 Infilling Processes

Following the disuse of the feature, infilling ensued. Most SSLs at Redeemer contain a primary infill layer and a surficial refuse layer, as is commonly seen for SSLs in southern Ontario. The primary infill layer varies across the site, ranging in depth between 25 cm and 65 cm, and consisting of both simple and complex stratigraphy. Simple stratigraphy presented as one or two layers of yellow to yellow brown subsoil, while more complex examples had up to seven soil layers alternating between thick layers of yellow to yellow brown subsoil and thin lenses of dark brown to black artifact-rich soils. It is not known whether the artifact-rich deposits were placed with purpose or were placed as means to tidy the surrounding area. In some cases, particularly within the ramped entrances, artifact-rich layers appeared to contain pot smashes and ceramic pipes, and appeared to have been deposited near the end of the primary infilling event, before the SSL was filled to the surface. No patterns were noted in terms of location and alignment, suggesting the

primary infilling event did not follow any prescribed protocols at the end of an SSL's use but was rather idiosyncratic in nature.

Fire-cracked rock is often cited as being recovered from the primary fill layer of a SSL. Fire-cracked rock can be difficult to distinguish in the field. At Redeemer, fire-cracked rock was occasionally recovered from SSLs, though not as commonly as one might expect given its predominance on other sites. In many cases, fire-cracked rock was not noted within the field notes; however, it is unknown whether this is an oversight, a lack of proper identification, or an actual absence of fire-cracked rock within SSLs. Despite the lack of documented fire-cracked rock, evidence of heated stones was present within F135 where an *in situ* ring of stones, fire-cracked rock, and hard ash accretions were present centrally within the body of the SSL, immediately above the basal layer (Image 19). Such a finding indicates that hot stones were present within the feature, lending further support to notion of sweat bathing.

Image 19: Feature 135 – Stone Ring on Basal Layer

The surficial refuse layer appears to have been deposited over time following the primary infilling event. The surficial refuse layer on SSLs at Redeemer is a richly organic dark brown or black sandy loam with significant artifact concentrations. It seems likely that in cases where the SSL was not infilled up to the surface level, that the slight depression the feature left would have been an ideal location for refuse. At Redeemer, 30 of the 36 SSLs contained a surficial refuse layer. The fact that most of the SSLs had a surficial refuse layer filled with occupational debris

highlights the temporary nature of most SSLs; namely, many were obviously abandoned and infilled prior to the abandonment of the village. Of the remaining SSLs, F45 was truncated due to property grading and therefore contributed no data. However, the surface of the five other SSLs (F23, F74, F228, F237, and F256) was nearly indistinguishable from the surrounding subsoil. These five SSLs were located across the village, with one in House 3, one in House 4, one in the West House, one in the South House, and one located external to a house. No apparent patterns arise when considering the location and alignment of SSLs that do not contain a surficial refuse layer based on a visual inspection. As such, it seems prudent to note that for future village site excavations, extra care should be taken to identify even minute differences in soil colour or consistency to ensure all SSLs are identified in the field and excavated accordingly. This may be especially true for potential SSLs located external to houses, which are not well documented in the literature.

Image 20: Feature 74 – Note Absence of Surficial Refuse Layer

4.4 Artifact Distributions and SSLs

Artifact distribution analyses were aimed at identifying whether the deposition of artifacts within SSLs varied depending on dimensional attributes, basal layer depth, location, and alignment. Both total recovered assemblage counts and frequencies of artifacts of significance were considered. For a description of artifacts of significance, see Section 3.4.2. In addition to looking at the distribution of artifacts of significance between SSLs in different houses, SSLs were

also compared to other feature types to assess whether certain artifact types were more commonly recovered from SSL contexts. See Appendix B for tallies of SSL total recovered assemblage and frequency of artifacts of significance.

4.4.1 Total Recovered Assemblage

4.4.1.1 Total Recovered Assemblage – Tests of Normality

Tests of normality demonstrated that the variable total recovered assemblage does not follow a normal distribution. As a result, nonparametric tests were completed for the total recovered assemblage statistical testing wherever possible.

4.4.1.2 Total Recovered Assemblage and Dimensional Attributes

To assess whether SSL total recovered assemblage was correlated with any of the dimensional attributes, the Spearman's correlations test was applied. For this test, only total length, width, and depth were considered given there was no reliable data for the recovery of artifacts from the ramped entrance. Positive correlations were identified for total SSL length and total recovered assemblage (Spearman's rho=.502, p=.002), and SSL depth and total recovered assemblage (Spearman's rho=.433, p=.008), suggesting longer and deeper SSLs contain more artifacts. SSL width does not appear to be correlated with total artifact count (Spearman's rho=.228, p=.181).

4.4.1.3 Total Recovered Assemblage and Basal Layer Thickness

To assess whether SSL total recovered assemblage was correlated with SSL basal layer thickness, the Spearman's correlations test was applied. No significant correlation was found between basal layer thickness and total recovered assemblage (Spearman's rho=-.011, p=.949).

4.4.1.4 Total Recovered Assemblage and Spatial Characteristics – Comparisons between SSLs located in Houses and SSLs located External to a House

Statistical tests were completed to determine whether there were any differences in SSL total recovered assemblage between SSLs located external to houses and SSLs that were associated with houses. The Mann-Whitney test demonstrated that there are differences at a 0.057 significance level, with higher counts being recovered from SSLs associated with houses (Median=763, Range=3 to 3401) than those that were located external to a house (Median=301, Range=130 to 394). Given that two of the four SSLs that are not associated with houses are located

south of the access road where faunal remains counts are absent, it is a distinct possibility that these results are not accurate.

4.4.1.5 Total Recovered Assemblage and Spatial Characteristics – Comparison of SSLs between Houses

To assess whether there were any differences in total recovered assemblage between SSLs located in different houses, the Kruskal Wallis test was completed. House 5 and the Northwest House were removed from the dataset as they only provided a single observation, and a new group was added, which includes the four SSLs that are located exterior to a house. According to the Kruskal Wallis test, there are statistically significant differences between total recovered assemblage when considering SSL location (Chi-Square=17.085, p=.017). Table 15 provides descriptive statistics for the total recovered assemblage variable between the different locations used in this analysis. Not surprisingly, SSL locations with the lowest total recovered assemblage were the South House (Median=89) and SSLs not associated with houses (Median=301). Again, it is probable that the lack of faunal remains data has skewed this result. Regardless, the remaining locations do demonstrate significant differences, with House 1 (Median=2367) and House 2 (Median=1491) containing significantly more items from SSL contexts than from other houses across the site.

Table 15: Total Recovered Assemblage and SSL Location – Descriptive Statistics

Location	Mean	N	Std. Deviation	Median	Minimum	Maximum
House 1	2079.33	3	1486.52	2367	470	3401
House 2	1491.00	2	789.13	1491	933	2049
House 3	862.54	13	474.98	839	111	2010
House 4	357.67	4	274.85	420	57	596
East House	652.67	3	289.50	651	364	943
South House	96.33	3	97.21	89	3	197
West House	720.67	2	476.63	773	220	1169
Exterior to House	281.50	4	111.98	301	130	394
Total	795.32	34	732.91	752	3	3401

4.4.1.6 Total Recovered Assemblage and Spatial Characteristics – Comparison of Differently Aligned SSLs

To assess whether there were variations in total recovered assemblage between differently aligned SSLs, the Kruskal Wallis test was applied. No differences were found in SSL total recovered assemblage between differently aligned SSLs (Chi-square=1.99, p=.370).

4.4.1.7 Total Recovered Assemblage and Spatial Characteristics – Comparisons of Differently Aligned SSLs, between Houses

A two-way ANOVA was used to assess the variation in SSL total recovered assemblage across both house and alignment. House 5 and the Northwest House were excluded since they only had one observation each. First, the Levene's test of equality of variances was conducted and was accepted (F=2.396, p=.061). The results of the two-way ANOVAs show that there are significant differences in total recovered assemblage when considering house location (F=2.896, p=.043), but not alignment (F=.433, p=.655). An examination of the estimated marginal means demonstrates that house location accounts for almost 45% of the between-subjects variation compared to less than 5% for alignment. Pairwise comparisons demonstrate that House 1 (M=2134, SD=452) has the largest number of items recovered from SSLs when compared to House 3 (M=965, SD=234), House 4 (M=413, SD=452), and the South House (M=198, SD=527) (all p<.05). However, the pairwise comparisons demonstrate that House 2 (M=1366, SD=490) is not statistically different from House 1 (p=.266). Overall, these results suggest that house location is a stronger determinant for the number of artifacts recovered from a SSL over alignment, and that the total recovered assemblage from SSLs varies across the houses.

4.4.2 Artifacts of Significance

This section provides an analysis of the distribution of artifacts of significance between SSLs, and between SSLs and other feature types, aimed at identifying whether there are any trends across the site, and whether those trends are significant. Additionally, intact animal remains are noted in the literature as occasionally being recovered from the SSL basal layer, with known examples of articulated bird wings, turtle shells, and deer and bear skulls. Articulated animal remains were recovered from several Redeemer SSLs, and descriptions of them are provided separately from the artifacts.

4.4.2.1 Artifacts of Significance– Tests of Normality

Tests of normality demonstrated that the total number of artifacts of significance recovered from SSLs does not follow a normal distribution. As a result, nonparametric tests were completed for statistical testing wherever possible.

4.4.2.2 Artifacts of Significance and Basal Layer Thickness

To assess whether the total number of artifacts of significance recovered from SSLs was correlated with SSL basal layer thickness, the Spearman's correlations test was applied. No significant correlation was found between basal layer thickness and total number of artifacts of significance (Spearman's rho=.041, p=.819), suggesting basal layer thickness is unrelated to the deposition of artifacts of significance.

4.4.2.3 Artifacts of Significance and Spatial Characteristics – Comparison of SSLs between Houses

To assess whether there were any differences in the total number of artifacts of significance recovered from SSLs located within different houses, the Kruskal Wallis test was completed. House 5 and the Northwest House were removed from the dataset as they only provided a single observation. According to the Kruskal Wallis test, there are no statistically significant differences between the total number of artifacts of significance recovered from SSLs when considering SSL house location (Chi-Square=6.157, p=.406). Table 16 provides descriptive statistics for the total number of artifacts of significance between the different locations used in this analysis. While House 1 and House 2 have larger medians for artifacts of significance compared to other houses, the differences are not statistically significant. This may be the result of the limited data provided by Houses 1 and 2, with only three and two SSLs found in each house, respectively.

Table 16: Artifacts of Significance and SSL Location – Descriptive Statistics

Location	No. of SSLs	Mean	Std. Deviation	Median	Minimum	Maximum
House 1	3	9.67	9.5	10	10	19
House 2	2	9.00	8.49	9	3	15
House 3	13	4.46	3.46	4	1	11
House 4	4	1.67	2.89	.0000	0	5
East House	3	1.67	2.08	1	1	4
South House	3	1.33	2.31	.0000	0	3
West House	2	3.00	2.00	3	1	5
Total	30	4.27	4.71	3	0	19

4.4.2.4 Artifacts of Significance and Spatial Characteristics – Comparison of Differently Aligned SSLs

To assess whether there were variations in the total number of artifacts of significance recovered from SSLs depending on alignment, the Kruskal Wallis test was applied. No differences were found in the total number of artifacts of significance between differently aligned SSLs (Chi-square=1.08, p=.581).

4.4.2.5 Artifacts of Significance and Spatial Characteristics – Comparisons of Differently Aligned SSLs, between Houses

Statistical testing was also aimed at ascertaining whether the total number of artifacts of significance recovered from SSLs varied between differently aligned SSLs, with house location included as an additional source of variation. A two-way ANOVA was used to assess the variation in the number of artifacts of significance recovered from SSLs across both house and SSL alignment. House 5 and the Northwest House were excluded since they only had one observation each, and the East House was also removed due to poor settlement pattern data. First, the Levene's test of equality of variances was conducted and was accepted (F=2.028, p=.104). The results of the two-way ANOVAs show that there are no significant differences in the total number of artifacts of significance recovered from SSLs when considering house location (F=1.298, p=.308), or alignment (F=.051, p=.950). However, an examination of the estimated marginal means demonstrates that house location accounts for a significantly larger portion of variation (Partial eta^2=.265) than alignment (Partial eta^2=.006). These results indicate that the deposition of artifacts of significance within SSLs was commonplace across the site, with neither house location nor SSL alignment being significant determining factors for the recovery of artifacts of significance. However, when considering both variables, house location appears to be a slightly better predictor for the recovery of artifacts of significance.

4.4.2.6 Artifacts of Significance Distributions – Feature Comparisons by Artifact Type

To address the question of whether artifacts of significance are equally distributed across all feature types, a Chi-Square test was applied. The results indicated that artifacts of significance are not equally distributed across all feature types (Chi-Square=9034, p=.013).

Table 17 details the number and percentage of artifacts of significance by artifact type, and feature location. Most striking is the recovery of 81.3% of all bone awls from SSL contexts. While 100% of bone bracelets and copper objects were recovered from SSLs, their counts were low, being one and three items, respectively. Bone beads (75.9%), bone toggles (80%), and stone objects (69.2%) were also found in relatively high frequencies within SSL contexts. Only 48.6% of ceramic pipes were recovered from SSLs, with the remainder being distributed across all other feature types. Bone pins were equally found in SSLs (40%) and storage pits (40%).

Table 17: Artifacts of Significance by Feature Deposition

Artifact of Significance	Number/Percentage	Ash Pit	Midden	Other	Post Mould	Refuse Pit	Refuse/Ash Pit	Refuse/Midden	Special Purpose Pit	Storage Pit	SSL	Total
Awls	#	0	4	0	3	1	0	0	1	0	39	48
	%	0.0	8.3	0.0	6.3	2.1	0.0	0.0	2.1	0.0	81.3	100.0
Bone Bead	#	1	1	0	1	3	1	0	0	0	22	29
	%	3.4	3.4	0.0	3.4	10.3	3.4	0.0	0.0	0.0	75.9	100.0
Bone	#	0	0	0	0	0	0	0	0	0	1	1
Bracelet	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	100.0
Bone Pin	#	0	0	0	0	1	0	0	0	2	2	5
	%	0.0	0.0	0.0	0.0	20.0	0.0	0.0	0.0	40.0	40.0	100.0
Bone Toggle	#	0	1	0	0	0	0	0	0	0	4	5
	%	0.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	80.0	100.0
Ceramic	#	1	20	11	13	6	0	1	3	2	54	111
Pipes	%	0.9	18.0	9.9	11.7	5.4	0.0	0.9	2.7	1.8	48.6	100.0
Copper	#	0	0	0	0	0	0	0	0	0	3	3
Object	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	100.0%
Stone Object	#	0	3	0	0	0	0	0	1	0	9	13
	%	0.0	23.1	0.0	0.0	0.0	0.0	0.0	7.7	0.0	69.2	100.0
Total	**#**	**2**	**29**	**11**	**17**	**11**	**1**	**1**	**5**	**4**	**134**	**215**
	%	**0.9**	**13.5**	**5.1**	**7.9**	**5.1**	**0.5**	**0.5**	**2.3**	**1.9**	**62.3**	**100.0**

4.4.2.7 Artifacts of Significance Distributions – Deposition within SSLs versus All Other Features (Combined)

To ascertain whether the deposition of artifacts of significance within SSL contexts is significant when compared to their deposition within other feature contexts combined, Fisher's exact test was applied. The results demonstrate there is a significant association between artifacts of significance and their recovery within SSL contexts (Fisher's exact test=23.1, p=.000).

4.4.2.8 Artifacts of Significance and Spatial Characteristics – Deposition across Features and Houses

To determine whether houses differed in terms of the feature types from which artifacts of significance were recovered, a Chi-Square test was completed. House 5 was removed as it did not contain artifacts of significance. Table 18 displays the number of artifacts of significance by house and feature type. The Chi-Square test indicated that there is a significant association between house and feature type; namely, that artifacts of significance were not recovered from the same places across the different houses (Chi-square=96.7, p=.000). For example, while in most houses artifacts of significance were recovered predominantly from SSL contexts (>70%), artifacts of significance were more evenly distributed across feature types within House 4, the East House, and the West House, all of which had relatively low numbers of artifacts of significance. However, artifacts of significance were still most frequent in SSLs within House 4, the West House, and the East House.

Table 18: Artifacts of Significance by House and Feature Type

Artifacts of Significance	Number/ Percentage	Ash Pit	Refuse Pit	Refuse/Ash Pit	Refuse/Midden	Storage Pit	SSL	Total
House 1	#	0	0	0	0	0	29	29
	%	0.0	0.0	0.0	0.0	0.0	100.0	100.0
House 2	#	0	2	0	1	0	20	23
	%	0.0	8.7	0.0	4.3	0.0	87.0	100.0
House 3	#	1	12	2	0	0	57	72
	%	1.4	16.7	2.8	0.0	0.0	79.2	100.0
House 4	#	2	1	4	0	1	7	15
	%	13.3	6.7	26.7	0.0	6.7	46.7	100.0
East House	#	0	0	3	0	0	5	8

Artifacts of Significance	Number/ Percentage	Ash Pit	Refuse Pit	Refuse/Ash Pit	Refuse/Midden	Storage Pit	SSL	Total
	%	0.0	0.0	37.5	0.0	0.0	62.5	100.0
South House	#	0	0	0	0	0	6	6
	%	0.0	0.0	0.0	0.0	0.0	100.0	100.0
West House	#	0	2	0	0	3	6	11
	%	0.0	18.2	0.0	0.0	27.3	54.5	100.0
Northwest House	#	0	0	0	0	0	1	1
	%	0.0	0.0	0.0	0.0	0.0	100.0	100.0
Total	**#**	**3**	**17**	**9**	**1**	**4**	**131**	**165**
	%	**1.8**	**10.3**	**5.5**	**0.6**	**2.4**	**79.4**	**100.0**

4.4.2.9 Artifacts of Significance and Spatial Characteristics – Deposition across Features (Combined) and Houses

A similar analysis was completed by collapsing all feature types different from SSLs. Fisher's exact test was completed and demonstrated again that there is a significant association between house and feature type; namely, that artifacts of significance were not recovered from the same places across the different houses (Fisher's exact test=25.0, p=.000). Specifically, artifacts of significance were less likely to found in SSLs in House 4 and the West House when compared to other houses.

4.4.3 Recovery of Animal Remains

Three examples of the unique deposition of animal remains from the basal layer of an SSL were identified at Redeemer. Feature 24, the SSL located outside the south palisade wall, contained an unmodified distal phalanx from an owl. Feature 24 contains the only owl specimen recovered from the entire site. No mention of the owl bone is made in the feature excavation notes suggesting it was only identified during faunal analysis, rather than in the field. Feature 45 in House 5 contained a deer scapula, placed flat on what it believed to be the basal layer of this feature. Feature 227 in House 3 contained a complete and intact turtle shell that was located on top of the basal layer of F227, immediately below the ramped entrance of F207 (Image 21). In addition to the turtle shell recovered from F227, exploratory analyses of the unmodified faunal remains resulted in the

determination that of the remaining turtle shell fragments in the assemblage (125), most were recovered from SSL contexts (114), with the remainder being recovered from post moulds in House 3 (9), House 4 (1), and the West House (1). Of the fragments recovered from SSLs, Feature 86 in House 1 contained 31 fragments, and Feature 229 in House 3 contained 83 fragments. No other analyses were completed for the unmodified faunal assemblage due to incomplete data.

Image 21: Feature 227 – Turtle Shell

5.0 INTER-SITE COMPARISONS

This chapter is focused on providing a comparison of SSLs from a variety of sites. The purpose is twofold. First, to provide an update to the 2001 MacDonald and Williamson article on the Hubbert site (BbGw-9) that provided a comprehensive overview of archaeological sites identified as containing SSLs (Section 5.1). And second, to complete a more in-depth analysis of selected sites aimed at identifying SSL variability across southern Ontario and to ascertain whether there are any temporal or regional trends in SSL location, alignment, and dimensional attributes (Section 5.2 and 5.3). APPENDIX IV contains all data associated with the inter-site analyses.

5.1 Archaeological Sites with SSLs in Southern Ontario

In 2001, MacDonald and Williamson published an article providing a summary of the research conducted at the Hubbert site (BbGw-9), a fifteenth century Iroquoian village. A unique characteristic of the village was the frequency with which SSLs appeared on the site; 17 SSLs were identified within one completely excavated and two partially excavated longhouses. MacDonald and Williamson (2001) indicated that by 2001, 40 sites in southern Ontario had been identified as containing SSLs. Since the publication of this article, an additional 12 sites have been identified as containing SSLs (Table 19). When the 52 sites were considered together, they were found to span from London to Durham Region, and north to Simcoe and Bruce Counties. The earliest site identified as containing an SSL during the current research was the Praying Mantis site (AfHi-178) located in Middlesex County, while the latest site appears to be the Dunsmore site (BcGw-10) located in Simcoe County. In total, at least 314 SSLs have been documented in southern Ontario, providing a wealth of data from which to complete comparative analyses. In examining the number of SSLs per village, a few stand out as having particularly frequent occurrences of SSLs. The three villages with the highest frequencies include the Redeemer site (AhGx-114) with 36 SSLs, the Alexandra site (AkGt-53) with 28 SSLs, and the Dunsmore site (BcGw-10) with 23 SSLs. These three villages are regionally and temporally diverse, suggesting that each village's requirements for SSLs may have varied depending on their specific circumstances.

Table 19: SSL Occurrence in Southern Ontario
(Adapted from MacDonald and Williamson 2001)

Site	Borden No.	Region	Houses	SSLs	Max No. SSL/ House	Comments	Reference
13th to Early 14th Centuries							
Praying Mantis	AfHi-178	Middlesex	3	1	1	Completely excavated	Howie-Lang 1998; Pearce 2008
Myers Road	AiHb-13	Waterloo	10	18	6	Completely excavated; great horned owl wing	Williamson 1998
Anderson	AhGx-54	Haldimand-Norfolk	5+	1+	1	Partially excavated	Bursey 1996
Uren*	AfHd-3	Haldimand-Norfolk	11	8?	3?	Partially excavated; burials	Wright 1982; 1986
Olmstead	AhGx-32	Hamilton	4+	1+	1	Partially excavated	Welsh and Williamson 1994
Bennett*	AiGx-1	Halton	7+	5+	2	Partially excavated; burials and one deer skull	Wright and Anderson 1969
Gunby*	AiGx-5	Halton	10+	7+	2	Partially excavated	Rozel 1979
H&R	Unknown	Halton	1+	1+	1	Limited testing	Finlayson 1998
Laurenssen	AiGx-10	Halton	1+	1+	1	Limited testing	Finlayson 1998
South Track	AiGx-90	Halton	1+	3+	2	Limited testing	Finlayson 1998
Antrex	AjGv-38	Peel	8	4+	2	Completely excavated; partially documented	Mayer et al. 1991; Robertson and Williamson 2002
Barrie	BcGw-18	Simcoe	2+	2+	1	Partially excavated	Sutton 1999
Holly	BbGw-58	Simcoe	7	15	4	Completely excavated	ASI 2009
Seppala	BdGu-12	Simcoe	?	1	?	Limited testing; sweat lodge isolated	Lennox et al. 1997
Wellington	BcGw-55	Simcoe	2	3	2	Completely excavated; special purpose site	Pihl and Williamson 2000; ASI 2005
14th Century							
Dorchester	AfHg-24	Middlesex	17	ND	ND	Completely excavated	Keron 2000; TMHC, no published summary
Tilsonburg	AfHe-38	Oxford	15	18	5	Partially excavated	Archaeologix Inc 2002; Golder Associates 2009
Reid*	AdHc-5	Haldimand-Norfolk	3+	2	2	Almost completely excavated	Wright 1978
Nodwell*	BcHi-3	Bruce	12	6	2	Completely excavated	Wright 1974
Dougherty-Slius	AhHa-158	Hamilton	2+	1	1	Partially excavated	Ferris 1993 (personal communication)
Redeemer	AhGx-114	Hamilton	9?	36	13	Completely excavated; incomplete village plan	Woodley 2008; 2012
Serena	AhGx-274	Hamilton	6	3	2	Completely excavated	ASI 2004
Pipeline	AiGx-12	Halton	4+	2	1	Partially excavated; sweat lodge isolated	D.R. Poulton & Associates Inc. 2016
Unick*	AiGx-11	Halton	5+	3+	2	Limited testing	Finlayson 1998
Alexandra	AkGt-15	York	17	28	3	Completely excavated; human remains, woven matt	ASI 2008a
Hutchinson	AkGt-34	York	2	4	1	Completely excavated; special purpose site	Robertson 2004

Site	Borden No.	Region	Houses	SSLs	Max No. SSL/ House	Comments	Reference
New	AlGt-36	York	6	4	2	Partially excavated	ASI 2010b
Robb	AlGt-4	York	9	1	1	Completely excavated; disturbed settlement patterns	ASI, no published summary
Gimiiwaan	AlGs-341	Durham	1+	1		Partially excavated; turtle plastron	TRCA 2014; 2015
Dykstra	BbGw-5	Simcoe	1	2	1	Completely excavated; special purpose site	Clish 2000; ASI 2006
Lee	BbGw-26	Simcoe	8	2?	1	Completely excavated	Michael Henry, personal communication 1998
Wiacek*	BcGw-26	Simcoe	5	6	3	Completely excavated; bear skull	Lennox et al. 1986; Robertson et al. 1995
15th Century							
Norton	AfHh-86	London	9+	1	1	Partially excavated; SSL between and accessible from 2 houses	Cooper and Robertson 1993
AiHc-414	AiHc-414	Waterloo	4	8	?	Partially excavated	Derek Lincoln 2017, personal communication
Coleman	AiHd-7	Waterloo	3+	4+	3	Partially excavated	MacDonald 1986
Day	AiHd-73	Waterloo	1	2	2	Completely excavated; special purpose site	Dodd and Riddle 1993
Moyer*	AiHc-2	Waterloo	11	1	1	Partially excavated	Wagner et al. 1973
Alderson Farm	AiGx-157	Halton	6	5	3	Completely excavated	Griffin-Short in Finlayson 1998
Crawford Lake*	AiGx-89	Halton	12+	11+	4	Partially excavated	Finlayson 1998
Pengilley	AjGw-66	Peel	2+	1	1	Partially excavated	D.R. Poulton & Associates Inc. 2016
Baker	AkGu-15	York	4	5	1	Completely excavated; bear skull, pipe	ASI 2006b
Hope	AlGv-199	York	13	5	2	Partially excavated	ASI 2011a
McNair	AlGu-8	York	7	3	2	Completely excavated	ASI 2012
Murphy-Goulding	AlGu-3	York	4	5	3	Completely excavated	ASI 1996; This Land Archaeology 2016
Orion	AlGu-45	York	6	1	1	Completely excavated	ASI 2008b
Over	AlGu-120	York	7+	3	1	Almost completely excavated	Sutton 1996
Parsons	AkGv-8	York	10+	3	2	Partially excavated; human remains	Robertson et al. 1998
Grandview	AlGr-59	Durham	11	6	2	Completely excavated; deer skull and scapula	Austin et al. 1999
Bauman*	BdGv-14	Simcoe	2+	1+	1	Partially excavated	Stopp 1985
Carson	BcGw-9	Simcoe	8	20	5	Completely excavated	Parker et al. 1990; Varley 1993
Dunsmore	BcGw-10	Simcoe	15	23	6	Completely excavated; burials	ASI 1996
Hubbert	BbGw-9	Simcoe	3	17	9	Partially excavated	MacDonald and Williamson 2001

* denotes site was excavated prior to the identification of SSLs as a feature type; MacDonald and Williamson (2001) reviewed site data and identified features as SSLs for their publication

In examining the maximum number of SSLs per house at each village, the Redeemer site (13 SSLs), Hubbert site (9 SSLs), Myer's Road site (6 SSLs), and Dunsmore site (6 SSLs) were the only villages that contained more than five SSLs within a single house. Again, these sites were noted as being regionally and temporally diverse, providing support to the notion that even the requirements for SSLs *within* a village were highly variable. Additional analyses were completed for a selection of sites from the above table to assist in ascertaining whether temporal or regional SSL variability existed; these results are presented in the following sections.

5.2 Selection of Sites for Comparisons

In addition to the data from Redeemer, 17 sites were selected for the purposes of inter-site comparisons. To provide a temporally diverse sample, six sites were selected from the three time period categories identified in Table 19: the thirteenth to early fourteenth centuries, the fourteenth century, and the fifteenth century. The selected sites were also regionally diverse, with examples from London, Waterloo, Hamilton, Peel, York, and Simcoe. Sites were selected based on the availability of reports; many of the sites in Table 19 were excavated between the 1960s and the 1980s, and reports were either not available for review, or contained incomplete information that was required for these analyses. Once these reports were excluded from the potential data pool, 17 sites were randomly selected (six from the thirteenth to fourteenth centuries, five from the fourteenth century, and six from the fifteenth century). The Redeemer site served as the final site required for the fourteenth century time period category. A summary of the selected sites is provided below.

5.2.1 Thirteenth to Early Fourteenth Century Sites

5.2.1.1 The Antrex Site (AjGv-38)

The Antrex site (AjGv-38) is located within the Regional Municipality of Peel along a minor tributary of Cooksville Creek. Excavations of the site were undertaken in 1990 and 1991 by Mayer *et al*. (1991) and between 1992 and 1994 by ASI (2010a). The site was found to span approximately 0.65 hectares and contained six confirmed longhouses, with two additional unconfirmed longhouses. Two primary clusters of houses were observed, partially encircled by a palisade wall. Four SSLs were identified in total. Based on the recovered material culture, the Antrex site was dated to the Middleport Substage of the Middle Iroquoian period. Radiocarbon

dating indicated that the Antrex site dated 800+/-75BP, calibrated to A.D. 1250, though the site excavation report notes that at the 2-sigma confidence level, the calibrated date extends into the third quarter of the fourteenth century. However, ceramic seriation demonstrated a classic Middleport assemblage, and so it was thus considered that the radiocarbon dating provided evidence for the transitional nature of Middle Iroquoian development and the regionally diverse progress of associated material culture changes (ASI 2010). Based on material culture, the site fits more closely with sites dated to the fourteenth century.

5.2.1.2 The Holly Site (BbGw-58)

The Holly site (BbGw-58) is located in the City of Barrie, Simcoe County along a branch of Bear Creek. Stage 4 excavations of the site were undertaken between 1998 and 2000 by ASI (2009). The site was found to span roughly 1.32 hectares and contained four longhouses, three smaller houses or special purpose structures, and a final structure (Structure A) for which only partial settlement patterns were observed. No palisade walls were encountered. Fifteen SSLs were identified in total. Based on the artifact assemblage and on ceramic seriation, the Holly site was dated to early fourteenth century, and was interpreted as an ancestral Wendat village that was at some point also occupied by Algonquian people (ASI 2009). More recently, six AMS radiocarbon dates for the Holly site have been produced using carbonized maize kernels. Together, they provide a calibrated date of A.D. 1290-1305 (Creese 2011).

5.2.1.3 The Myers Road Site (AiHb-13)

The Myers Road site (AiHb-13) is located in the City of Cambridge, Waterloo County along the Grand River and Moffat's Creek. Stage 4 excavations of the site were undertaken in 1987 and 1988 by ASI (Williamson et al. 1998). The site was found to span roughly 2.4 hectares. Ten longhouses were encountered: four were encircled by a discontinuous palisade, four were superimposed by the palisade, and two were located north of the palisade wall. Based on settlement patterns, the site was subject to at least four large-scale building phases. Eighteen SSLs were identified in total. Based on the archaeological data, the Myers Road site was interpreted as having been intermittently occupied from the beginning the Uren substage (A.D. 1280) to the middle of the Middleport substage (A.D. 1330-1360).

5.2.1.4 The Praying Mantis site (AfHi-178)

The Praying Mantis site (AfHi-178) is located in City of London, Middlesex County within the Thames River drainage basin. Stage 4 excavations of the site were undertaken in 1993 by London Museum of Archaeology (now Museum of Ontario Archaeology) (Pearce 1994). The site was found to span roughly 0.23 hectares. Three longhouses were encountered that were encircled within a palisade wall (Howie-Lang 1998; Pearce 2008), with additional but discontinuous lines of post moulds suggesting the presence of earlier structures. One SSL was identified, located adjacent to an animal burial and a human burial. Based on the recovered assemblage and ceramic seriation, the Praying Mantis site dated to the Early Iroquoian period (A.D. 1000-1300) and represents the earliest known archaeological site to contain an SSL in southern Ontario. This broad temporal range is the result of an absence of radiocarbon dates and a lack of researchers providing a more specific timeframe based on ceramic seriation (Howie-Lang 1998; Pearce 2008). In a more recent study, Creese (2012) suggested the site dates to around A.D. 1250-1275 based on the presence of an SSL.

5.2.1.5 The Olmstead Site

The Olmstead site (AhGx-32) is located in the City of Hamilton along a tributary of Redhill Creek. Investigations of the site were undertaken in 1987 by ASI (ASI 1988), with additional Stage 1-4 assessments beginning in 1989 (ASI 1994) and continuing through the early 2000s (Detritus Consulting 2004, 2006, 2007, 2011; ASI 2010c; 2011b; Golder Associates 2012, 2013, 2014; TMHC 2015). Based on the available data, the site was estimated to span 2.55 hectares. While only a small portion of the site has been excavated, five possible longhouses and a palisade wall were documented. The houses all appeared to overlap, and due to poor soil conditions, settlement reconstruction was not possible. A single SSL was identified in between House 3 and House 4, though did not appear to be associated with either given the direction of the ramped entrance. Based on the recovered material culture, the Olmstead site was dated to the late thirteenth to early fourteenth centuries. Given the previously identified sites in the area, it had been posited that following the occupation of the Olmstead site, the community moved to settle at the nearby Redeemer site (AhGx-114), and then potentially moved back to the Olmstead area to settle at the Serena site (AhGx-274) (ASI 2004). The lack of good settlement pattern data makes Olmstead

impossible to compare to other sites; however, it is documented in this section due to its proximity to and possible relationship with the Redeemer site.

5.2.1.6 The Wellington Site (BcGw-55)

The Wellington site (BbGw-55) is located in the City of Barrie, Simcoe County along a tributary of Bear Creek. Stage 4 excavations of the site were undertaken in 1998 by ASI (2005). The site was found to span roughly 1 hectare and contained two longhouses, with no palisade walls or fences encountered. Three SSLs were identified in total. The settlement patterns and material culture of the site seemed to indicate that Wellington may have housed both northern Iroquoians and Algonkian residents, a notion supported by the differing construction methods for the two longhouses, as well as differences in material culture, feature distributions, and the presence of Algonkian animal pit burials. A single radiocarbon test on maize kernel returned a calibrated date of A.D. 1256, ranging between A.D. 1215-1285 at one sigma (ASI 2005). This date was supported by the recovered assemblage and ceramic seriation and places the Wellington site in the late thirteenth century. The site was further interpreted as being a possible predecessor of the nearby Holly site (BbGw-58), Dykstra site (BbGw-5), Wiacek (BcGw-26), and Hubbert site (BbGw-9).

5.2.2 Fourteenth Century Sites

5.2.2.1 The Alexandra Site (AkGt-15)

The Alexandra site (AkGt-53) is located in the City of Toronto along a branch of Highland Creek. Excavations of the site were undertaken in 2000 by ASI (2008a). The site was found to span roughly 2.6 hectares and contained 16 longhouses with several longhouse clusters observed. Nearly all the longhouses showed evidence of long-term maintenance activities, and several phases of building activities were noted. No palisade walls were encountered. Based on the settlement patterns and material culture, it appeared the south half of the site developed first, with the village growing to the north. Twenty-eight SSLs were identified in total: 18 were identified within the north half of the village (dispersed amongst seven houses), and a further ten were identified in the south half (dispersed among eight houses). Radiocarbon dating of a reed mat returned two calibrated dates. The first was AD 1410 (1315-1440 at one sigma) and the second was AD 1430 (1405-1438 at one sigma) (ASI 2008a). Based on the recovered material culture and ceramic seriation, the Alexandra site was dated to the late fourteenth century, possibly extending into the fifteenth century.

5.2.2.2 The Dykstra Site (BbGw-5)

The Dykstra site (BbGw-5) is located in the City of Barrie, Simcoe County along a branch of Bear Creek. Stage 4 excavations of the site were undertaken in 1999 by ASI (2006a). The site was found to span roughly 0.5 hectares and contained one longhouse and several post rows that may have represented either fences or exterior structures (Structures A through E). No palisade walls were encountered. Two SSLs were identified in total, with one being associated with House 1 and the other located in an open area in the north half of the site, north of Structure C. The SSL in House 1 was noted as being located along the central corridor and was oriented in an unusual manner that may indicate the SSL pre- or postdated the construction of the house. House 1 was open-ended and was likely seasonally occupied. Based on the recovered material culture and ceramic seriation, the Dysktra site was dated to the late fourteenth century and was likely a seasonally occupied location rather than a village site.

5.2.2.3 The New Site (AlGt-36)

The New site (AlGt-36) is located in the City of Markham, York County along a branch of Bear Creek. Stage 4 excavations of the site were undertaken in 1977 by Kapches (Kapches 1981) and in 2005 and 2006 by ASI (2010b). The site was found to span roughly 2.1 hectares and contained six longhouses. In general, the longhouses were found within two discrete clusters separated by a large open area, though the house identified during the 1977 excavation appeared to be located along the eastern edge of the village adjacent to the open space. No palisade walls were encountered. Five SSLs were identified in total, all of which were identified within the northern cluster of houses and in the house identified in the 1977 excavations. Little maintenance of longhouses was observed, suggesting the village may have seen a relatively short occupation. Based on the recovered material culture and ceramic seriation, the New site was dated to the last half of the fourteenth century.

5.2.2.4 The Serena Site (AhGx-274)

The Serena site (AhGx-274) is located in the City of Hamilton along a tributary of Redhill Creek. Stage 4 excavations of the site were undertaken between 1995 and 1998 by ASI (2004). The site was found to span roughly 1.25 hectares and contained six longhouses. A palisade wall measuring 140 m long was documented. It appears Houses 1 and 2 were built first, following which House 1 was dismantled and an extensive palisade wall was erected in its place. Houses 3, 4, 5,

and 6 were then constructed east of the palisade wall, with many of the houses demonstrating long term maintenance activities, which suggested there was a considerable length of occupation to the second phase of this community. Three SSLs were identified in total. Based on the recovered material culture and ceramic seriation, the Serena site was dated to the mid-fourteenth century.

5.2.2.5 The Tillsonburg Site (AfHe-38)

The Tillsonburg site (AfHe-38) is located in the Town of Tillsonburg, Oxford County, along Stony Creek. Stage 4 excavations of the site were undertaken between 2000 and 2001 by Archaeologix Inc. (2002) and in 2008 by Golder Associates (2009). The site was found to span roughly 16 hectares and contained 15 longhouses. The longhouses were widely dispersed across the site, with somewhat more clustering observed in the west half of the site. Several large open spaces were noted within the village plan. While it is unknown whether all of the houses were contemporaneous, this is the largest known Middle Iroquoian village in Ontario, and it is possible the site extends even further to the north and west. No palisade wall was encountered. Eighteen SSLs were identified in total, spread amongst nine houses. Based on the recovered material culture and ceramic seriation, the Tillsonburg site was dated to the late fourteenth to early fifteen centuries.

5.2.3 Fifteenth Century Sites

5.2.3.1 The Baker Site (AkGu-15)

The Baker site (AkGu-15) is located in the Regional Municipality York along a minor tributary of the East Don River. Excavations of the site were undertaken in 2000 by ASI (2006b). The site was found to span roughly 1 hectare and contained four well-defined longhouses oriented parallel to one another in a northeast to southwest direction. All longhouses showed evidence of long-term maintenance activities. No palisade walls were encountered. Five SSLs were identified in total. Based on the recovered material culture and ceramic seriation, the Baker site was dated to the early fifteenth century. Settlement patterns indicated the site was intensively occupied prior to the community amalgamations and heavily fortified villages seen later in the fifteenth century in this region.

5.2.3.2 The Dunsmore Site (BcGw-10)

The Dunsmore site (BcGw-10) is located in Vespra Township, Simcoe County along a tributary of Willow Creek. Stage 4 excavations of the site were undertaken by ASI in 1989 and

1990 (ASI 1996), though previous investigations of the site were completed by Andrew F. Hunter (1907), and Frank Ridley (1968). The site was found to span approximately 2 hectares and contained 16 longhouses. The community plan was described as disordered, with longhouses not appearing to have been formally laid out, though several clusters of houses were observed. No palisade walls were encountered, though a series of fences and windbreaks were documented. Twenty-three SSLs were identified in total, 12 of which occurred within the core settlement area. Radiocarbon dating of a carbonized maize cob returned a date of 430+/-70BP, calibrated to A.D. 1450 and ranging between cal A.D. 1430-1610 at one sigma and A.D. 1340-1640 at two sigmas (Robertson and Williamson 2003). When considering both the radiocarbon dates and the recovered assemblage, the Dunsmore site appears to have been occupied in the second half of the fifteenth century. Settlement patterns indicated the site had a complex history that involved year-round occupation and seasonal occupation, either concurrently or not.

5.2.3.3 The Hope Site (AlGv-199)

The Hope Site (AlGv-199) is located in Vaughan Township, York County along a tributary of the East Don River. Stage 4 excavations of the site were undertaken between 2003 and 2005 by ASI (ASI 2011a). The site was found to span roughly 3.0 hectares and contained 13 longhouses within two distinct clusters that were separated by the tributary. No palisade walls were encountered, though a 69 m long fence was present within the south cluster. Two SSLs were identified in total. Based on the recovered material culture and ceramic seriation, the Hope site was dated to the first half of the fifteenth century. Settlement patterns indicated the site was relatively large and was occupied year-round.

5.2.3.4 The Hubbert Site (BbGw-9)

The Hubbert site (BbGw-9) is located in Innisfil Township, Simcoe County within the Lovers Creek drainage. Stage 4 excavations of the site were undertaken in 1990 by ASI (MacDonald and Williamson 2001). The site was found to span roughly 1 hectare and contained three longhouses, two of which were completely excavated, and the third of which comprised only a house end. No palisade walls were encountered. Seventeen SSLs were identified in total, with an additional six potential above ground sweat lodges also identified. Radiocarbon dates for a blended sample of carbonized maize recovered from 12 features at the site returned a date of 550+/-75 BP, which was calibrated to A.D. 1406 and ranges between A.D. 1386 and 1406 at one sigma

(MacDonald and Williamson 2001). This date agreed well with the recovered material culture and places the Hubbert site in the first half of the fifteenth century. The frequency with which SSLs occurred on the site suggested that the structures may have been fundamental to everyday life, particularly if they were "related to a curing society that functioned as a socially unifying institution within the emergent Middle and early Late Iroquoian periods" (MacDonald and Williamson 2001:73)

5.2.3.5 The Norton Site

The Norton site (BbGw-9) is located in the City of London along a tributary of the Thames River. Stage 4 excavations of the site were undertaken in 1987 and 1988 by ASI (Cooper and Robertson 1993). Only a small portion of the site was subject to investigations, namely a 100 m long corridor, to accommodate the installation of buried utilities. While site size is unknown, portions of nine aligned longhouses were documented, suggesting the village was well-established and planned, as most of the houses are 2 m apart. No palisade walls were encountered. Only a single SSL was identified, being located within an open area between Houses 2 and 3. Use of the sweat lodge, then, was not necessarily limited to members of either associated household since it did not appear to have been dependent upon access to either house. It is possible that particularly close social and political relationships existed between the occupants of Houses 2 and 3 (Cooper and Robertson 1993:40). Based on the recovered material culture and ceramic seriation, the Norton site was dated to the first half of the fifteenth century.

5.2.3.6 The Orion Site

The Orion site (BbGw-9) is located in the Town of Richmond Hill, York County along a tributary of the Rouge River. Stage 4 excavations of the site were undertaken in 1997 by ASI (ASI 2008b). The site was found to span roughly 1 hectare and contained six aligned longhouses. No palisade walls were encountered. Only a single SSL was identified, being associated with House 1. Based on the recovered material culture, the Orion site was dated to the first half of the fifteenth century. Settlement patterns and cultural material from Orion were noted to be remarkably like that of the nearby Murphy-Goulding site (AlGt-3), suggesting that the two sites may have been segments of a single village spanning 3 hectares. If this is true, it is possible that the Orion/Murphy Goulding site is an example of village coalescence. Based on the recovered material culture and ceramic seriation, the site appears to date to the early fifteenth century.

5.3 SSL Analyses

The SSL analyses completed for the inter-site comparisons were focused on identifying whether temporal or regional variability is present with respect to SSL location, alignment, and dimensional attributes. The 18 selected sites provided a dataset consisting of 182 SSLs. The following section presents the results of this analysis.

5.3.1 Location

To examine the variable *location* at each site, the following data were considered: total number of SSLs per site, total number of houses within each site that contained SSLs, maximum number of SSLs per house within each site, and the average area taken up by SSLs compared to the total average living space area provided by each longhouse. Following data tabulation, an examination of potential temporal or regional trends was completed. A first line of inquiry was aimed at ranking sites based on their total number of SSLs to provide a distribution summary (Table 20). As previously noted, the sites containing the highest frequencies of SSLs were the Redeemer site (36 SSLs), the Alexandra site (28 SSLs), and the Dunsmore site, (23 SSLs). Four additional sites had between 15 and 18 SSLs, while the remaining 11 sites had five or fewer documented SSLs. When percentages were calculated, 16.7% of the selected sites had between 23 and 36 SSLs, 22.2% of the sites contained between 15 and 18 SSLs, and 61.1% of the sites had five or fewer SSLs.

Table 20: Number of SSLs at Selected Sites

Site	Date	Region	# of SSLs
Redeemer	14th century	Hamilton	36
Alexandra	14th century	York	28
Dunsmore	15th century	Simcoe	23
Myers Road	13th to Early 14th	Waterloo	18
Tilsonburg	14th century	Oxford	18
Hubbert	15th century	Simcoe	17
Holly	13th to Early 14th	Simcoe	15
Baker	15th century	York	5
New	14th century	York	5
Antrex	13th to Early 14th	Peel	4
Serena	14th century	Hamilton	3
Dykstra	14th century	Simcoe	2
Wellington	13th to Early 14th	Simcoe	2
Hope	15th century	York	2
Praying Mantis	13th to Early 14th	London	1
Orion	15th century	York	1

Site	Date	Region	# of SSLs
Norton	15th century	London	1
Olmstead	13th to Early 14th	Hamilton	1

A second line of inquiry was focused on looking at the number of houses within each site that contained SSLs (Table 21). At four sites, all the documented houses (100%) contained at least one SSL. At six additional sites, 60% to 75% of the documented houses contained at least one SSL. At a further six sites, 50% or less of the documented houses contained at least one SSL. Finally, two sites only contained SSLs that were not associated with a specific house. At the Norton site, the sole SSL was located between House 2 and House 3, with possible access from both houses. At the Olmstead site, the only SSL identified did not appear to be associated with any houses, though settlement patterns at this site were poorly delineated.

Table 21: Number of Houses Containing SSLs at Selected Sites

Site	Date	Region	# of Houses	% of Houses Containing SSLs
Redeemer	14th century	Hamilton	9	100.0
Hubbert	15th century	Simcoe	3	100.0
Wellington	13th to Early 14th	Simcoe	2	100.0
Dykstra	14th century	Simcoe	1	100.0
Baker	15th century	York	4	75.0
Holly	13th to Early 14th	Simcoe	7	71.4
Alexandra	14th century	York	17	70.6
Dunsmore	15th century	Simcoe	16	62.5
Tilsonburg	14th century	Oxford	15	60.0
Myers Road	13th to Early 14th	Waterloo	10	60.0
Antrex	13th to Early 14th	Peel	8	50.0
New	14th century	York	6	50.0
Serena	14th century	Hamilton	6	33.3
Praying Mantis	13th to Early 14th	London	3	33.3
Hope	15th century	York	6	16.7
Orion	15th century	York	6	16.7
Norton	15th century	London	9	0.0
Olmstead	13th to Early 14th	Hamilton	4	0.0

A third line of inquiry was aimed at identifying how SSLs were distributed within longhouses across the selected sites, specifically looking at how much space SSLs occupied compared to the total living area of each house. A limitation in this analysis was that it had to assume that all SSLs were in use concurrently, which in general cannot be confirmed. Consequently, the results must be viewed with caution. For this analysis, SSL area within each house was measured, as was the total living space area of each house. House living space area

included the total house area as well as the area of appended SSLs that were located outside of the house walls. An average of the measurements across the site was then calculated, following which the sites were ranked (Table 22). The results demonstrated that on average, at most of the sites SSLs occupied limited amounts of space, amounting to 5% or less of the total living space area. However, three sites stood out as having notably high percentages: the Hubbert site (20.1%), the Redeemer site (10.5%), and the Holly site (7.5%). Such high percentages suggest the use of SSLs at these three sites may have been a more important part of everyday life than on the other sites considered here.

Table 22: SSL Area Compared with House Living Area from Selected Sites

Site	Date	Region	# of Houses	# of SSLs	Average SSL to Living Space Area (%) (houses with SSLs only)	Range (%) per House
Hubbert	15th century	Simcoe	3	17	20.1	17.5-26.8
Redeemer	14th century	Hamilton	9	36	10.5	1.9-21.8
Holly	13th to Early 14th	Simcoe	7	15	7.5	3.6-13.4
Orion	15th century	York	6	1	4.8	4.8
Dunsmore	15th century	Simcoe	16	23	4.5	2.3-26.7
Dykstra	14th century	Simcoe	1	2	4.4	4.4
Wellington	13th to Early 14th	Simcoe	2	2	4.1	2.9-4.8
Alexandra	14th century	York	17	28	3.8	1.3-7.2
Antrex	13th to Early 14th	Peel	8	4	3.5	3.0-4.4
Serena	14th century	Hamilton	6	3	3.2	2.2-4.0
Myers Road	13th to Early 14th	Waterloo	10	18	2.6	0.8-5.7
Tilsonburg	14th century	Oxford	15	18	2.4	0.9-6.0
New	14th century	York	6	5	2.2	2.1-2.2
Baker	15th century	York	4	5	1.9	0.6-3.4
Praying Mantis	13th to Early 14th	London	3	1	1.8	1.8
Hope	15th century	York	6	2	0.85	0.8-0.9

As a final line of inquiry, an examination of SSLs that were not associated with houses was completed. Contrary to previous thought (Williamson et al. 1998; MacDonald 1988), SSLs that are located external to houses have been identified on several sites. Of the 182 SSLs considered in this analysis, nine SSLs (4.9%) were identified as being located external to houses distributed across six sites. The sites include Redeemer, Dykstra, Holly, Norton, Olmstead, and Tilsonburg (Table 23). While Redeemer contained four SSLs that were not associated with houses, the other sites contained only one SSL each that was located external to a house. Dykstra, Holly, and Tilsonburg each had an SSL that was located away from the houses, while the externally located SSL at Norton was located between two houses, with possible access from each house (Cooper

and Robertson 1993). Due to poor settlement patterns at Olmstead, the association of the external SSL is less clear, particularly as overlapping houses were present. However, the excavators noted that the SSL did not appear to be associated with any of the documented houses (Welsh and Williamson 1994).

Table 23: Number of SSLs Located External to a House from Selected Sites

Site	Date	Region	Total # of SSLs	# of SSLs External to a House
Redeemer	14th century	Hamilton	36	4
Dykstra	14th century	Simcoe	2	1
Holly	13th to Early 14th century	Simcoe	15	1
Norton	15th century	London	1	1
Olmstead	13th to Early 14th century	Hamilton	1	1
Tillsonburg	14th century	Oxford	18	1

An exploration of potential temporal and regional variability in SSLs was considered for the total number of SSLs at each site. Regarding temporal variations in frequency, it appeared that most of the SSLs (50.8%) were identified on fourteenth century sites (Table 24). Sites with the fewest SSLs date from the thirteenth to the early fourteenth centuries (22.4%), and fifteenth century sites contained the second most SSLs (26.8%). When the number of SSLs per time period is averaged across sites, a similar distribution is apparent.

Table 24: Temporal Distribution of SSLs from Selected Sites

Date	# of Sites	Total # of SSLs	% of Total SSLs	Average # SSLs per Period
13th to Early 14th	6	41	22.5	6.8
14th century	6	92	50.3	15.3
15th century	6	49	26.9	8.2
Total	**18**	**182**	**100.0**	n/a

SSLs were also tallied by region (Table 25). Since Oxford, Waterloo, and Peel only provided data from one site each, it was decided they would be combined with their closest regional groupings: Oxford was combined with London, Waterloo was combined with Hamilton, and Peel was combined with York. Simcoe stands out at having the highest frequency of SSLs (32.2%), followed closely by Hamilton-Waterloo (31.7%), then York-Peel (25.1%), and London (10.9%). When the number of SSLs per regional grouping is averaged across the sites, Hamilton-Waterloo has the highest frequency of SSLs per site, with an average of 14.5 SSLs. Simcoe was slightly lower at 11.8 SSLs per site, though it should be noted that one of the sites included in this

analysis was the Dykstra site, a special purpose site rather than a village like the others. When Dykstra is removed from the equation, the average number of SSLs per site in Simcoe is 14.3, which is almost identical to the Hamilton-Waterloo Region. A limitation in this analysis was that the number of sites selected within each region was disproportionate and required aggregation across two of the regions, thus the results must be considered with caution.

Table 25: Regional Distribution of SSLs from Selected Sites

Date	# of Sites	Total # of SSLs	% of Total SSLs	Average # SSLs per Region
London- Oxford	3	20	10.9	6.7
Hamilton - Waterloo	4	58	31.7	14.5
York - Peel	6	45	25.1	7.5
Simcoe	5	59	32.2	11.8
Total	**18**	**182**	**100.0**	**n/a**

5.3.2 Alignment

Tabulation of the differently aligned SSLs at each site was completed and is presented in Table 26. SSLs located along the bunk line of the longhouse are most prevalent, accounting for 45.6% of the SSLs from the selected sites. Appended SSLs are the next most frequent alignment category (36.8%) followed by SSLs located along the central corridor (11.0%). Nine SSLs were not associated with a house (4.9%). and three SSLs, all from Redeemer, had an unknown alignment (1.6%).

Table 26: SSL Alignments from Selected Sites

Date	Total # of SSLs	% of SSLs
Appended	67	36.8
Bunk Line	83	45.6
Central Corridor	20	11.0
External	9	4.9
Unknown	3	1.6
Total	**182**	**100.0**

Additionally, an exploration of potential temporal and regional variability in SSLs was considered for the total number of SSLs at each site. Regarding temporal variability in alignment, it appears that during the thirteenth to early fourteenth centuries, appended SSLs were most common (46.3%) followed by SSLs that were located within the bunk line (36.6%) (Table 27). A

limited number of SSLs were also documented within the central corridor (12.2%). In the fourteenth century, SSLs placed within the bunk line became more frequent (42.4%), though appended SSLs continued to be common (35.9%). SSLs within the central corridor had a similar frequency as seen in the thirteenth and early fourteenth centuries (12.0%). Finally, SSLs in the fifteenth century saw similar trends to those in the fourteenth century. SSLs in the bunk line increased in frequency (59.2%), and appended SSLs steadily decreased.

Table 27: Temporal Distribution of SSL Alignement from Selected Sites

Alignment	13th to Early 14th Century		14th Century		15th Century	
	#	%	#	%	#	%
Appended	19	46.3	33	35.9	15	30.6
Bunk Line	15	36.6	39	42.4	29	59.2
Central Corridor	5	12.2	11	12.0	4	8.2
External	1	2.4	6	6.5	1	2.0
Unknown	1	2.4	3	3.3	0	0.0
Total	**41**	**100.0**	**92**	**100.0**	**49**	**100.0**

SSLs were also tallied by region (Table 28). Since Oxford, Waterloo, and Peel only provided data from one site each, it was determined they would be combined with their closest regional groupings: Oxford was combined with London, Waterloo was combined with Hamilton, and Peel was combined with York. The results demonstrated there was regional variation in alignment. Most of the SSLs in London-Oxford were evenly split between being appended and located within the bunk line. Simcoe showed a similar distribution, again with most of the SSLs being either appended or located within the bunk line, with the addition of seven SSLs documented along the central corridor. Differences in alignment were also evident between the Hamilton-Waterloo region and the York-Peel Region. In the former, there appeared to be a preference for SSLs that were appended over being located within the bunk line. In contrast, the York-Peel Region alignments were dominated by SSLs located within the bunk line, and then in the central corridor. SSLs within the central corridor were absent in London, and SSLs that were not associated with houses were absent in York-Peel. Again, a limitation in this analysis was that the number of sites selected within each region was disproportionate, and thus the results must be interpreted within caution.

Table 28: Regional Distribution of SSL Alignment from Selected Sites

Alignment	London- Oxford		Hamilton-Waterloo		York-Peel		Simcoe	
	#	%	#	%	#	%	#	%
Appended	9	45	27	46.6	7	15.6	24	40.7
Bunk Line	9	45	18	31.0	30	66.7	26	44.1
Central Corridor	0	0	5	8.6	8	17.8	7	11.9
External	2	10	5	8.6	0	0.0	2	3.4
Unknown	0	0	3	5.2	0	0.0	0	0.0
Total	**20**	**100**	**58**	**100**	**45**	**100**	**59**	**100**

5.3.3 Dimensional Attributes

The mean and range of dimensional attributes was calculated for the 182 SSLs included in this analysis. The dimensional attributes that were considered included total SSL length, width, and depth. The mean SSL length was 305.9 cm and ranged between 150 cm and 493 cm. The mean width was 195.9 cm and ranged between 85 cm and 385 cm. The mean depth was 47.4 cm and ranged between 4 cm and 105 cm. The results demonstrated that the documented SSLs had a wide range of dimensional attributes, though the lower depth measurements likely resulted from site disturbance or deflation rather than true, valid measures of depth. Table 29 presents the mean length, width, and depth of SSLs by site.

Table 29: Mean Dimensional Attributes of SSLs fom Selected Sites

Site	Date	Region	# of SSLs	Mean Length (cm)	Mean Width (cm)	Mean Depth (cm)
Alexandra	14th century	York	29	271.6	198.3	27.5
Antrex	13th to Early 14th	Peel	2	255	184.3	44
Baker	15th century	York	5	316	212	31.6
Dunsmore	15th century	Simcoe	22	303.1	171.4	47.7
Dykstra	14th century	Simcoe	2	315	217.5	44.5
Holly	13th to Early 14th	Simcoe	15	316	212.9	65.9
Hope	15th century	York	2	278.5	213	39
Hubbert	15th century	Simcoe	17	300	162.4	53.2
Myers Road	13th to Early 14th	Waterloo	18	297.6	168.6	41.7
New	14th century	York	5	328.4	181.6	38
Norton	15th century	London	1	342	194	ND
Olmstead	13th to Early 14th	Hamilton	1	221	200	28
Orion	15th century	York	1	350	200	50
Praying Mantis	13th to Early 14th	London	1	282	185	28
Redeemer	14th century	Hamilton	36	329.2	219.7	62.9
Serena	14th century	Hamilton	3	292.7	209.7	18
Tilsonburg	14th century	Oxford	18	330.1	217.9	43.1
Wellington	13th to Early 14th	Simcoe	2	310.3	184	69

Temporal and regional variability were also considered for the dimensional attributes. Regarding temporal variability, length appeared to increase over time, width was largest during the fourteenth century, and depth was greatest during the thirteenth to fourteenth century and lowest during the fourteenth century (Table 30). When compared against the total mean for all 182 SSLs, it appeared that thirteenth century sites had SSLs that were below average in all dimensional attributes except depth, suggesting that on average, SSLs became longer and wider over time.

Table 30: Temporal Distribution of SSL Dimensional Attributes from Selected Sites

Date	# SSLs	Mean Length (cm)	Mean Width (cm)	Mean Depth (cm)
13th to Early 14th	41	280.3	189.1	46.1
14th century	92	311.2	207.4	39.0
15th century	49	314.9	192.1	44.3
Total	182	305.9	195.9	47.4

The number of SSLs was also tallied by region (Table 31). Since Oxford, Waterloo, and Peel only provided data from one site each, it was determined they would be combined with their closest regional groupings: Oxford was combined with London, Waterloo was combined with Hamilton, and Peel was combined with York. The results showed that the Hamilton-Waterloo region had the longest and widest SSLs, while Simcoe had the deepest SSLs. When compared against the means of all 182 SSLs, the Hamilton-Waterloo and Simcoe SSLs had above average lengths, and Simcoe SSLs had below average widths and above average depths. A limitation in this analysis was that the number of sites selected within each region was disproportionate, thus results from this analysis must be considered within caution.

Table 31: Regional Distribution of SSL Dimensional Attributes from Selected Sites

Date	# SSLs	Mean Length (cm)	Mean Width (cm)	Mean Depth (cm)
London- Oxford	20	285.1	199.5	37.7
Hamilton - Waterloo	58	318.0	199.0	35.6
York - Peel	45	299.9	198.2	38.3
Simcoe	59	308.9	186.1	56.1
Total	182	305.9	195.9	47.4

5.3.4 Summary

The inter-site analysis of SSLs has demonstrated that there is a trend towards temporal and regional variability for location, alignment, and dimensional attribute variables. SSLs were most frequent in the fourteenth century, increasing from the late thirteenth and early fourteenth centuries and decreasing towards the fifteenth century. Of the selected sites, SSLs are most frequent in the Simcoe and Hamilton-Waterloo areas. While appended SSLs are most frequent during the late thirteenth and early fourteenth centuries, they steadily decrease in number as the fifteenth century is approached, being replaced by SSLs that are located along the bunk line. The number of SSLs that are located within the central corridor are present in small but equal frequencies in both the thirteenth and the fourteenth centuries but decrease in the fifteenth century. Regionally, the Simcoe and London-Oxford regions contain sites with similar SSL alignment distributions, equally preferring SSLs that are appended and that are located within the bunk line. The Hamilton-Waterloo and York-Peel regions demonstrate opposite alignment distributions, with the former preferring appended SSLs and the latter having a higher frequency of SSLs located within the bunk line. Finally, in general, SSL dimensional attributes appear to increase over time, and the Hamilton-Waterloo area has the largest SSLs.

6.0 DISCUSSION AND CONCLUSIONS

Research on the SSLs of the Redeemer site has provided a unique opportunity to examine the construction, use and disuse of this feature class, and further, has allowed for an exploration of the social, political, and built environment of the Redeemer community. A summary of the SSL trends illuminated by this research is presented below and is used to posit hypotheses about the lived experiences of the Redeemer community. The Redeemer site is in turn situated within the archaeological record through a comparison to other sites, and a look at other nearby sites to which it could be related. Finally, limitations of the present work and future avenues for research are presented.

6.1 SSL Trends at Redeemer

6.1.1 Trend 1: SSL Construction as Common Community Practice

Analyses of the spatial and morphological attributes of the Redeemer SSLs as well as artifact distribution data have resulted in the identification of several trends at the site. Of the 36 documented SSLs at Redeemer, 32 were associated with houses, and four were located external to houses within different parts of the village. That each house contained at least one SSL suggests their construction and use was a common practice for the occupants of the site. However, the residents of the longhouses appeared to have differing requirements for SSLs, as seen through an analysis of the number of SSLs per house, and by looking as SSL area to living space area percentages. For example, a disproportionate number of SSLs were located within House 3 (36.1%), with the remainder being distributed across the other houses and ranging from one to four SSLs per house. SSL area to living space area percentages provided an alternate method for looking at differences between houses. Based on this research, longhouse memberships devoted differing amounts of space to SSLs. For example, Houses 1, 2, 3, and the West House devoted a notable portion of the living space to the placement of SSLs, with SSLs occupying more than 10% of the observed living space. This trend may indicate that these longhouse memberships had a stronger preference or need for sweat bathing than others in the community.

6.1.2 Trend 2: External SSLs are Present with Unusual Frequency

The identification of four SSLs that were not associated with houses suggests that SSL location within a village plan was not necessarily tied to a longhouse, contrary to previous thought.

In MacDonald and Williamson's (2001) examination of 240 SSLs, only one possible SSL was noted as being 'isolated,' or external to a longhouse. That four SSLs at Redeemer were not associated with houses demonstrates that SSLs can be located away from houses, and even outside palisade walls, and indicates that special care should be taking during site excavation to identify these seemingly rare occurrences. The relatively high frequency with which external SSLs appear on Redeemer is certainly unusual, and may be indicative of special use. This idea will be explored in more detail in Section 6.2.

6.1.3 Trend 3: Standardized SSL Construction Methods

Another identified trend relates to SSL construction as explored through variations in SSL dimensional attributes. While ranges in SSL dimensional attributes varied across the site, the number of significant correlations encountered suggests that the construction of SSLs at Redeemer was a standardized practice. For example, total SSL length was correlated with SSL width, depth, and body length, as well as ramped entrance length, width, and depth. SSL body length was also correlated with SSL width and depth. Finally, ramped entrance length was correlated with ramped entrance width, ramped entrance width was correlated with ramped entrance depth, and ramped entrance depth was correlated with SSL depth. Such regular correlations in SSL dimensional attributes is indicative of standardization and suggests that the village occupants shared a common understanding as to how to construct SSLs.

6.1.4 Trend 4: SSL Body Length Longest in Houses 2 and 3

SSL body length was the only dimensional attribute found to be statistically different when other sources of variation were considered. SSL body length is an attribute that has not been previously studied in detail. Longer SSL bodies may have allowed more individuals to be present during sweat bathing practices than shorter SSL bodies, and as such, analyses of this attribute had the potential to provide a meaningful avenue for exploring the variability of SSL size with respect to the number of people who could participate in a sweat. The presence of longer SSL bodies within specific houses could suggest the certain longhouse memberships had more people participating in a sweat at one time than within other houses. At Redeemer, House 2 had SSLs with longer body lengths than elsewhere on the site, closely followed by House 3. When House 3 SSL dimensional attributes were compared to all other SSLs, SSL body length was found to be statistically different, with House 3 having on average longer body lengths when compared to other

locations (except for House 2). This result indicates that in addition to containing the most SSLs, House 3 SSLs also had on average longer body lengths that would have accommodated more individuals for participation in sweat bathing practices. That House 2 had the longest SSL body length is interesting; unfortunately, the lack of preserved settlement patterns associated with House 2 makes it difficult to provide additional interpretation. However, based on the available data, House 2 would likely demonstrate similar statistical significance when testing for SSL body length, though this test was not completed.

6.1.5 Trend 5: Community Preference for Appended SSLs

Trends in alignment show that the residents of Redeemer preferred SSLs to be appended to the longhouse wall with access to the ramped entrance from within the longhouse (62.5%). SSLs that were located along the bunk line were the next most common alignment, accounting for 21.9% of SSLs. Finally, two SSLs were located within the central corridor (6.2%), and three SSLs had an unknown alignment due to poorly preserved settlement patterns (9.4%). That appended SSLs were most common suggests that longhouse space may have been at a premium. Appended SSLs would have left bunk line and central corridor areas available for other purposes, such as storage. Alignment was not correlated with dimensional attributes, basal layer thickness, or artifact distributions, suggesting that it was not a determining factor for how the SSLs were constructed, used, and infilled. Rather, alignment appears to be most strongly associated with issues of space.

6.1.6 Trend 6: Preference for SSL Bilateral Symmetry, Particularly in House 3

Related to alignment is the obvious bilateral symmetry of sweat lodges that are appended to the longhouse, or along the bunk line. Bilateral symmetry of SSLs occurs at Redeemer within four houses: House 1, House 3, House 4, and the South House. While bilateral symmetry is not present for all houses, paired SSLs do appear to be a relatively common organization within the village, and particularly at House 3. The frequent occurrence of bilateral symmetry at Redeemer suggests the design is indicative of some common community practice. As previously noted, MacDonald and Williamson (2001) have suggested that SSL placement decisions were based on distinct nuclear families having their own SSLs within a given longhouses. However, MacDonald and Williamson (2001) note that it remains unknown whether this practice relates to the ideological significance of particular locations within a house, or if it is more strongly associated with area allowances during initial bench line construction within the longhouse. Creese (2012) has

suggested that SSL bilateral symmetry might signify the coordination of SSL construction between two families sharing a centrally located hearth. Unfortunately, this research has not further illuminated why the practice of creating bilateral symmetry in the built environment occurred at the site, though it is possible that SSL bilateral symmetry simply represents the occurrence of two families sharing a hearth and who each required an SSL, possibly at different times.

6.1.7 Trend 7: External SSLs Contained the Thickest Basal Layers

Basal layer analysis provided evidence of another trend in SSLs at the site. As noted, it has been suggested the basal layer thickness could indicate the length of SSL use, with thicker deposits accumulating over time (Robertson 2004), or with increased frequency. Analysis of the basal layer was therefore focused on ascertaining whether there were any variations in basal layer thickness across the site, and to attempt to identify whether certain SSLs were in use for a longer period, or were more frequently used, than others. While basal layer thickness and SSL depth were not correlated, statistical tests demonstrated that basal layer thickness was related to certain spatial characteristics. For example, basal layers were significantly thicker in SSLs that were located external to houses when compared with SSLs that were associated with houses. This finding may suggest that SSLs that were not associated with houses at Redeemer were used over a longer period, or perhaps with more frequency. While it is unknown how long SSLs were utilized at any site, it seems plausible that SSLs that were not associated with houses did not need to be dismantled to accommodate changes to longhouses such as the rebuilding of walls or the redistribution of space for storage needs.

6.1.8 Trend 8: Thinnest Basal Layers Found in House 3 SSLs

While no statistically significant variations in basal layer thickness were found when compared to alignment or house location, SSLs in House 3 did have the thinnest basal layers, apart from the South House. If basal layer thickness is a good indicator for length or frequency of use, this finding could provide an explanation for the heightened presence of SSLs within House 3, possibly suggesting that House 3 SSLs were constructed for short-term use following which they were dismantled and infilled. New SSLs would have then been constructed as required. When both alignment and location were used as sources of variation to identify basal layer thickness trends, no differences were found; however, an examination of effect sizes determined by the partial eta^2

indicated that house location was a better predictor of the differences in basal layer thickness when compared to alignment.

6.1.9 Trend 9: Deposition of Artifacts in SSLs was a Common Community Practice, but Varied between Houses

Artifact distribution analyses also demonstrated there were trends in the deposition of artifacts and faunal and floral remains within SSLs across the site. For example, positive correlations were identified for total artifact count and total SSL length and depth, suggesting longer and deeper SSLs contained more artifacts than shorter and shallower SSLs. Basal layer thickness was found to be unrelated to total recovered assemblage. While not statistically significant, a trend towards significance was identified when comparing total recovered assemblage for SSLs that were associated with houses versus those that were not; SSLs associated with houses were found on average to contain more items than SSLs that were in isolated positions away from houses. This explanation seems plausible since houses tend to contain more refuse that could be disposed of during infilling events than areas that were located away from houses or other activity areas.

When considering between house variations in total artifact counts, house location was found to be a statistically significant factor. SSLs with the fewest artifacts were recovered from the South House. Given the poor settlement pattern data from this area and the lack of unmodified faunal assemblage data, this is unsurprising. However, differences in total artifact counts were found among other houses, with SSLs from House 1 and House 2 containing a significantly higher number of artifacts than SSLs from other houses. SSL alignment was not correlated with total artifact count. When both house location and alignment were used as sources of variation, effect sizes demonstrated that house location accounted for almost 45% of the between-subjects variation compared to alignment, which accounted for less than 5% of the variation, suggesting that house occupants may have had differing amounts of refuse to dispose, or opted for disposing of materials away from the house.

6.1.10 Trend 10: Deposition of Artifacts of Significance within SSLs was a Common Community Practice

Since the deposition of artifacts of significance is a commonly cited attribute of SSLs in southern Ontario, this research sought to identify whether similar patterns were present at Redeemer, and whether these patterns were significant. The analyses were two pronged: first, to

ascertain whether there was variation in the total number of artifacts of significance from SSL contexts compared to variables such as basal layer thickness, location, alignment, and both location and alignment; and second, to see if there was variation in their deposition within SSLs when compared to other feature types across the site. The results demonstrated that there are no significant differences in the total number of artifacts of significance when considering basal layer thickness, house location, or alignment. An examination of the total number of artifacts of significance using both house and alignment as sources of variation also demonstrated no statistically significant results. However, effect sizes indicated that house location accounted for a significantly larger source of variation (26.5%) than alignment (0.6%). Together, these findings suggest that the deposition of artifacts of significance within SSL contexts is common across the entire site, regardless of other sources of variation.

Feature comparisons produced results indicating that artifacts of significance are more commonly recovered from SSLs when compared to their deposition within other feature types. For example, 81.3% of bone awls were recovered from SSLs, as were all bone bracelets and copper objects, though the latter two had counts that were low, being one and three items, respectively. The bracelet was of particular note, being recovered from beneath the ramped entrance of an SSL. Additionally, bone beads (75.9%), bone toggles (80%), and stone objects (69.2%) including pipes, pendants, and gorgets were more commonly recovered from SSLs than other features. Most ceramic pipes (48.6%) were recovered from SSLs, with the remainder having low frequencies within ash pits, middens, post moulds, refuse and storage pits, the special purpose pit, and within features identified as 'other.' Finally, bone pins were equally found in SSLs (40%) and storage pits (40%), with an additional pin recovered from within a refuse pit (20%).

A similar test was completed that compared the deposition of artifacts of significance within SSL contexts to their deposition within all other feature types combined. Results indicated that the deposition of these unique artifacts within SSLs is statistically significant at the site. Two final tests added house location as a source of variation, and further confirmed that the deposition of artifacts of significance within SSLs is statistically significant. The results of these analyses clearly demonstrate that the deposition of artifacts of significance within SSLs at Redeemer is commonplace across the site and is likely indicative of a shared community practice in which items holding special meaning were preferentially placed within SSLs at the time of infilling, rather than being disposed of in other areas of the site.

6.1.11 Other Points of Interest

While no trends were identified for perimeter posts, ramped entrances, or infilling practices, the lack of such trends is illuminating in itself. The presence of perimeter posts is a commonly cited attribute of SSLs (MacDonald and Williamson 2001). At Redeemer, perimeter posts were identified for only 20 SSLs (55.6%), a lower presence than would be expected given their prevalence in the literature. Perimeter posts were encountered across the site in nearly all the houses, and from each alignment category, suggesting that spatial characteristics were not a determining factor for the use of perimeter posts. Of the 20 SSLs with perimeter posts, all but one had posts that were encountered at the bottom of the SSL. It is certainly possible that SSLs for which posts were not identified originally *did* contain posts that never extended deep enough to be identified through excavation, or had posts that were not set in the soil. Removal of these shallower posts prior to infilling could have resulted in a lack of observable evidence, possibly due to plough disturbance, causing invisibility in the archaeological record.

Specific studies on ramped entrances are absent in the literature, and so this research sought to identify specific categories by which the ramped entrance could be described, as isolated from the main SSL chamber. Analysis of the dimensional attributes of the ramped entrances demonstrated again that construction methods were relatively standardized across the site. In addition to calculating dimensional attributes, some effort was made to classify profiles to identify whether any variation was present across the site. Approximately half displayed a stepped profile and half displayed a profile with a gradual slope. It is unknown why this variation exists, and if it is significant of any meaningful practice. It is possible that differing ramped entrance construction methods allowed for different ways of entry, namely crawling versus stepping. Additional studies on SSL ramped entrances may provide more insight into this portion of the SSL.

Infilling processes of SSLs at Redeemer appear to be of an idiosyncratic nature rather than a standardized process. Most SSLs contained both a primary infill layer comprised of sandy subsoil and a surficial refuse layer comprised of dark, artifact rich soil. The primary infill layers ranged from simple to complex, with no noted patterns related to location, alignment, or any other variables. While artifacts were recovered from the primary infill layer, most were recovered from SSLs containing more complex stratigraphy, which included thin refuse layers of dark soil located within the primary infill layer. It remains unknown whether these lenses were placed for some purpose other than to dispose of surficial refuse during the infilling event. Of note is that the

ramped entrances do appear to have been filled in near the end of the infilling process, and that they often contained broken pot sherds and ceramic pipe fragments. Surficial refuse layers, when present, appear to be the result of deposition over time following the infilling of the feature. Five SSLs at Redeemer did not contain a surficial refuse layer and were nearly indistinguishable from the surrounding subsoil. As a result, care should be taken during future excavations to ensure these features are identified and documented appropriately.

6.2 The Social, Political, and Built Environment of the Redeemer Site

The florescence of SSLs at Redeemer is rather remarkable, with Redeemer containing the highest known frequency of SSLs compared to all documented sites in southern Ontario. This research has demonstrated several important trends in SSLs at Redeemer: the construction of SSLs was a common community practice with standardized construction methods, there was a concern for space seen in the preference for appended SSLs, and community members preferentially deposited artifacts of significance within SSLs across the site. These trends, along with other available data from the site, provide the basis on which inferences can be made regarding the social, political, and built environment of the site.

Prior to delving into these topics, an understanding of changes in the lifeways occurring in fourteenth century southern Ontario Iroquoian communities is required, along with an understanding of the community networks in operation at that time. The Redeemer site dates to *circa* AD 1320 to 1330 at the end of the Uren substage of the Middle Ontario Iroquoian period (Woodley 2008; 2012). This period is generally understood to be a time of significant changes in lifeways including the development of large, permanent villages, a fully developed horticultural system, new socially integrative institutions, and a relatively homogeneous material culture (Birch and Williamson 2013). Rapid and widespread population growth influenced the ways in which community development and cultural practices emerged, with community fission giving rise to community movement to the Simcoe County and Georgian Bay regions, and community amalgamation being noted closer to Lake Ontario. These population movements undoubtedly led to changes in sociopolitical and economic organization within and between newly formed communities (Braun 2015). Methods for social integration and organization may have included the appearance of formal matrilineages, the beginnings of clan organization, ossuary burial, and the use of SSLs (Birch and Williamson 2013).

Communities are multi-scalar in nature. In the context of the Middle Ontario Iroquoian period, communities were comprised of families, longhouse memberships, villages, clan affiliations, relations in natal communities, and trading partners from abroad, to name a few. To consider the concept of community further, some researchers have explored this topic using both natural and imagined community frameworks (Isbell 2000; Pauketat 2000; O'Gorman 2010). The natural community framework looks at communities as spatially bounded entities, seen archaeologically as sites where families shared a space and a sense of belonging, and interacted with other similarly bounded communities (Isbell 2000). In the imagined community framework, researchers consider community through an understanding of complex human concepts such as identity, gender, agency, and other social constructs (O'Gorman 2010). Within these frameworks, the community of Redeemer can be understood both as being a village site comprised of multiple longhouses each containing spaces for family chambers, and as being comprised of individuals with discrete identities who reside within social constructs such as family units, longhouse membership, village residents, and clan affiliations.

Community networks are also an important concept for examining how the residents of Redeemer engaged daily with their social-political and built environments. In her research on exploring the longhouse and community in tribal society, O'Gorman (2010) highlighted several inter-related networks that are relevant to this research, including relationships that exist among inter-related families with a single longhouse, among longhouse memberships within the village, and among clan and natal groups outside of the village. What becomes clear is that like most communities, the residents of Redeemer were constantly negotiating these different networks, expressed through both the built and the imagined community. Considering that Redeemer was occupied during a time of such significant change, the effort required to sustain community stability within and outside of the village boundaries would have been an act of daily maintenance that required participation by all. Assuming that SSLs provided one avenue for social and political integration, what can the SSLs of Redeemer tell us about the experiences of the Redeemer community?

Archaeologists have long posited that communal male sweat bathing became a more frequent practice during the Middle Ontario Iroquoian period as matrilocal and matrilineal societies were developing (Kapches 1995; MacDonald and Williamson 2001). SSLs could have provided a venue for men to host intra- and inter-village kinsmen and reinforce relationships in

both internal and external social networks. The socio-political advantage to strengthening ties outside of the village may have been particularly important during this time as a means to foster social cohesion and encourage community stability. Like other socially integrative mechanisms (e.g. ossuary burial), the practice of sweat bathing may have been a symbolic way to manifest the imagined community and promote a shared sense of interconnectedness.

The frequency with which SSLs appear at the Redeemer site indicates the practice of sweat bathing was an important facet of community life. At Redeemer, House 3 stood out as particularly unusual as it contained one third of SSLs documented at the site. It also retained the most complete settlement patterns. Analysis of the House 3 SSLs demonstrated that the SSLs were likely constructed and abandoned more frequently than their counterparts in other houses. This theory is based on the noted contemporaneity of specific SSLs within the house (F207/F227, F214/F218, and F196/232) and on the basal layers, the latter of which suggested House 3 SSLs were used for a shorter period of time than other SSLs across the site. House 3 SSLs also contained bodies that were statistically longer that other SSLs at the site and may have allowed for more people to participate in a sweat that in SSLs with smaller bodies.

House 3 had among the densest settlement patterns within the village, which may suggest the house was occupied the longest. Its central location within the village plan may also indicate a unique status among the other houses. As Englebrecht (2003) has posited, the longest longhouses within villages may have been inhabited by chiefs, used to hold political meetings or ceremonies, or used as ritual space analogous to a ceremonial square elsewhere in the world. While the visible plan of House 4 is longer than that of House 3, this research has demonstrated that the location of, accessibility to, and frequency of SSLs within House 3 each provide good evidence for a unique standing within the community. If community events involving sweat bathing practices were held within House 3, multiple SSL construction and deconstruction episodes would have undoubtedly have occurred. The above evidence suggests that the House 3 longhouse membership may have held a significant social or political standing within the village.

While most agree that sweat bathing acted as a socially integrative practice, SSLs may have also served as a venue for spiritual or ritual activity. As previously noted, ethnohistorical accounts suggest sweat bathing served a variety of purposes, including curing natural illnesses, promoting good health, predicting success in war, and invoking assistance from the spirits (Sagard as cited by Tooker 1964). If ethnohistorical accounts provide a good analogue for the sweat bathing

practices of the Middle Iroquoian period, then it seems likely that many of these purposes were similar through time. That SSLs were in some ways used for spiritual purposes could provide an explanation as to why the residents of Redeemer placed objects of significance within SSLs. As this research has demonstrated, artifacts of significance were preferentially deposited within SSL contexts throughout the village. Such preferential deposition within SSLs compared to other features suggests that the village occupants placed items of meaning with purpose. Items of significance may have been housed in the SSL during its lifetime, or once an SSL was no longer required. Depending on the purpose of the sweat, the placement of a significant item could have been done as an explicit ritual activity. Unfortunately, we cannot know the details or meanings of such activities.

Further support for both the socio-political and ritual uses of SSLs is provided by the recovery of unusual animal bones from the basal layer of a few SSLs at Redeemer. Such activity was documented in three SSLs including a turtle shell in House 3, a deer scapula in House 5, and the distal phalanx of an owl in the SSL located south of the south palisade wall (Feature 24). The deposition of large animal bones with pit features has been documented elsewhere in southern Ontario (Robertson et al. 1995; Timmins 1997; Ramsden et al. 1998; Austin 1999; Thomas 1999; Pearce 2008). It seems likely that the meaningful deposition of unusual animal remains such as animal skulls, rare birds, and reptile bones may have been placed for ritual purposes (Fox 1982; Timmins 1997; Pearce 2008), or perhaps for the purposes of signaling the symbolic identity of a clan (Pearce 2005; MacDonald and Williamson 2001). It is possible that at Redeemer, both may have been the case. While the deposition of the turtle shell and the deer scapula could potentially signal clan identity within their respective houses, the recovery of a distal phalanx of an owl from the only SSL located outside of the village boundaries is more suggestive of ritual deposition.

The unusual occurrence of four SSLs that were not associated with houses is unique to Redeemer, if only in frequency, and raises questions regarding access and specialized use. MacDonald and Williamson (2001) have suggested that access to SSLs that were located along the bunk line or appended to longhouse walls were likely family oriented, with family groups having ‘ownership’ over one area or compartment of the longhouse on either side of a centrally located hearth. Access to SSLs within a family’s space would have therefore been limited to family members, except by invitation. SSLs located along the central corridor potentially would have been accessible by at least two families, if not the whole of the longhouse membership. It is

therefore possible that SSL alignment may signify differing inclusion practices for sweat bathing experiences.

If this is the case, then SSLs that were not associated with houses may have served a different purpose. Externally located SSLs may have been used for special ceremonies, for individual use, or for sweats involving unrelated visitors. As demonstrated in this research, basal layer thickness data suggests that SSLs that were not associated within houses may have stood for a longer period, or were more frequently used, than their counterparts that were associated with houses. They were also situated within distinct locations across the site, with Feature 24 being particularly unique in that it was located outside of the village palisade. If the boundary created by the palisade evokes ideas of belonging/not belonging, in which the space within the boundaries was a safe place for the community, that an SSL was located outside of the village suggests that the practices that were occurring during the sweat could not be held within the boundaries of the village for some reason. Even the entranceway is not positioned for easy access from the village, with entry from the south. The recovery of a distal phalanx from an owl from the surface of the basal layer also provides support for a ritual function for this SSL.

This research suggests that the social experience at Redeemer as it pertains to sweat bathing was multi-faceted. Based on the distribution of SSLs, sweat bathing was likely at times an individual practice, was sometimes shared with family members and visiting relatives, and perhaps also experienced with trading partners or other visitors from abroad. Sweat bathing was used as a socially integrative mechanism, and was likely used for ritual practice as well, perhaps at times serving both functions concurrently. Sweat bathing was clearly an important part of the Redeemer community's collective experience, with the standardization seen in construction methods and in the deposition of artifacts of significance signifying a strong community of practice. This community of practice is not limited to Redeemer, as has been demonstrated through an examination of a selection of sites across southern Ontario.

6.3 SSLs and Sweat Bathing in Southern Ontario

At present, archaeologists have documented at least 314 SSLs from 52 sites in southern Ontario. The known distribution of SSLs extends from the London region to the Durham region, and north to the Bruce and Simcoe regions. SSLs have been encountered on at least one single component Early Iroquoian site, and persist until the late fifteenth century. These distribution

patterns demonstrate that, like other cultural practices and materials during the Middle Iroquoian period, the construction of SSLs and sweat bathing practices became a common occurrence across southern Ontario sites from the turn of the fourteenth century. To ascertain whether there were any temporal or regional trends in SSL location, alignment, and dimensional attributes, 18 sites (including Redeemer) representing 182 SSLs were selected for additional analyses. Based on the results of the inter-site comparisons, several trends were evident.

Regarding location, the results demonstrated that 61.1% of the selected sites had five or fewer SSLs, 22.2% had between 15 and 18 SSLs, and 16.8% had between 23 and 36 SSLs. This distribution suggests that while the construction of SSLs was a common practice across southern Ontario, not all communities had the same requirements for sweat bathing. This research has provided further evidence for this notion through an examination of the number of houses within each site that contained SSLs, which was found to vary dramatically. For example, only four sites had SSLs within each documented house, six sites had SSLs present within 60% to 75% of longhouses, and at the remaining eight sites, 50% or less of the documented houses contained at least one SSL. When examining the average SSL area to house living space area frequencies, most of the sites contained houses where SSLs occupied 5% or less of the total living space area. This suggests that for most sites, longhouse memberships did not devote a significant amount of space towards sweat bathing. However, three sites (Hubbert, Redeemer, and Holly) stood out as having significantly higher percentages suggesting that sweat bathing may have played a more important role within these communities compared than to other sites considered here.

Additional SSL variables considered in the inter-site analyses were alignment and dimensional attributes. Where alignment was concerned, it appears that most of the documented SSLs in southern Ontario were encountered within the bunk line of houses (45.6%), followed by those that were appended to the longhouse wall (36.8%), and then those located within the central corridor of the house (11.1%). Of the 182 SSLs considered in this analysis, only nine SSLs (6.7%) were identified as being located external to houses and they were distributed across six sites: Redeemer, Dykstra, Holly, Norton, Olmstead, and Tilsonburg. While Redeemer contained four SSLs that were not associated with houses, the other sites contained only one SSL each that was located external to a house. For dimensional attributes, means and ranges were calculated for the dataset, and demonstrated significant variability. The mean SSL length was 305.9 cm and ranged

between 150 cm and 493 cm. The mean width was 195.9 cm and ranged between 85 cm and 385 cm. The mean depth measured 47.4 cm and ranged between 4 cm and 105 cm.

Aside from these more general findings, this research also focused on identifying any temporal or regional trends in SSL location, alignment, and dimensional attributes. Based on the selected sample, temporal trends indicate that SSLs increased in frequency during the fourteenth century, and decreased in frequency during the fifteenth century. Regarding alignment, appended SSLs were most common on thirteenth to early fourteenth century sites followed by those along the bunk line and in the central corridor. However, from the fourteenth century onward, there appears to be a preference for SSLs being located within the bunk line, and a slight but steady decrease in SSLs that were appended to the longhouse wall. SSLs found along the central corridor were found in the same frequency during the thirteenth to the fourteenth centuries, with a decrease seen in the fifteenth century. Finally, regarding dimensional attributes, while some temporal variation was noted, on average SSLs became longer, wider, and deeper over time. This may indicate that more people were taking part in sweat baths (if increase in SSL size is correlated with an increase in the number of participants), even though the frequency of SSLs decreases after the fourteenth century.

Based on the selected sample, regional trends indicated that SSLs were most common in the Simcoe and the Hamilton-Waterloo area, followed by the York-Peel and the London-Oxford regions. Regarding alignment, the London-Oxford and Simcoe regions present similar distributions, with equal preferences for SSLs that were appended and those that were located within the bunk line. While no SSLs along the central corridor were encountered in the London-Oxford region, a small percentage were identified in Simcoe. In the Hamilton-Waterloo area, there appears to be a general preference for appended SSLs, followed by SSLs in the bunk line, while in the York-Peel region, the opposite is true. Both regions have a small number of SSLs that were located along the central corridor. Finally, regarding dimensional attributes, the Hamilton-Waterloo region had the longest and widest SSLs, while Simcoe had the deepest SSLs. When compared against the means of all 182 SSLs, the Hamilton-Waterloo and Simcoe region SSLs had above average lengths, and Simcoe region SSLs had below average widths and above average depths.

The results of the inter-site comparisons demonstrate that there are certainly general temporal and regional trends evident within the dataset. However, the variability with which SSLs

occur across southern Ontario and through time suggest that community requirements for SSLs and sweat bathing were highly variable, and were likely more dependent on community needs and on internal and external community networks than on rigid protocols for sweat bathing. This idea is exemplified by an examination of the movements of one village community to different locations and across generations, discussed below.

The settlement of Simcoe County by Iroquoian communities may have occurred due to increasing populations and resource competition along the north shore of Lake Ontario (ASI 2009). One possible community sequence in Simcoe County began with the settlement of the Wellington site, with subsequent village movements to the Holly site, the Wiacek site, and the Hubbert site. The Dysktra site was interpreted as a special purpose site that likely dated to around the occupation of Holly and/or Wiacek and is believed to have been utilized by the same community members. Evidence from these sites suggests that both Iroquoian peoples and their Algonkian neighbors resided at these sites (Lennox et al. 1986; Robertson et al. 1995; Clish 2000; Phil and Williamson 2000; MacDonald and Williamson 2001; ASI 2009).

SSL data from these sites was examined to see if and how the presence and attributes of SSLs changed over time for this community (see Section 5.3). Unfortunately, the Wiacek site contained incomplete data as the excavation of one half of the site occurred prior to the identification of SSLs as a feature class. As a result, Wiacek was excluded from this analysis. However, it is believed that six SSLs were documented at the site (MacDonald and Williamson 2001). The settlement patterns and material cultural at the Wellington site seem to suggest that the site may have acted as a place where "negotiations were held prior to the migration of the entire Iroquoian community from the north shore of Lake Ontario" (ASI 2005:119). The site contained one longhouse and one small house similar to Algonkian abodes. Holly, Wiacek, and Dykstra were all occupied during the fourteenth century, though the exact order of settlement is unclear, and all contained a mixture of longhouses and short Algonkian-like structures. Finally, the Hubbert site dates to the fifteenth century and only a small part of it has been excavated.

What becomes evident is that as this community developed over time, its requirements for SSLs also changed. For example, changes in the number of SSLs fluctuated over time, increasing dramatically in frequency during the occupations of both the Holly site and the Hubbert site. Similarly, average SSL to living space area ratios indicated that while the residents of Holly devoted a significant portion of living space towards sweat bathing (7.5%), during the fifteenth

century the Hubbert occupation saw a massive increase, with 20.1% of living space devoted to the placement of SSLs. The remaining sites each devoted less than 5% of living space to SSLs. Changes in alignment preferences were also evident, with appended SSLs being most prevalent at Holly, and shifting towards a preference for placement along the bunk line by the occupation of the Hubbert site. Finally, while SSL dimensional attributes increased from Wellington to Holly, they significantly decreased during the occupation of the Hubbert site.

When considered together, and without an examination of other contextual evidence, inferences can be made on the socio-political experiences of this community. The initial settlement at Wellington contained one SSL in each house, suggesting that sweat bathing practices may have held a role in the process of negotiating the community's settlement within the Simcoe region with their Algonkian neighbours (ASI 2009). The Holly settlement saw a significant increase in the construction of SSLs, which could indicate that the practice of sweat bathing also increased in frequency, perhaps to mitigate the tensions that arose from living within a borderland community. Even the special purpose Dkystra site contained two SSLs, one of which was not associated with a house. During the Wiacek settlement, there was a decrease in the use of SSLs implying a calmer period of time where sweat bathing was a less frequent practice. Finally, the considerable increase in SSL construction at the Hubbert site indicates that sweat bathing was a significant community practice. Why this increase occurred is unknown; however, it may be that as the Simcoe region became more densely populated, community networks came under pressure, and gave rise to a surge in sweat bathing practices to alleviate tensions and reinforce relationships.

Without more contextual evidence, the above interpretation is merely speculation. Regardless, it is certainly possible that more in depth studies on the changing requirements for SSLs within a community over generations can provide a meaningful interpretive avenue for a discussion of community interactions. Other lines of evidence that could be used to support SSL research might include reviews of other site settlement patterns that signify community unrest (e.g. defensive structures, expansion/contraction of village sites), human remains, and artifact assemblages.

6.4 Situating Redeemer

The Redeemer site is certainly unique amongst southern Ontario sites when considering SSLs. For example, the site contains the highest known frequency of SSLs over any other site, it has at least one SSL associated with each longhouse, and longhouse memberships devoted significantly more space to SSLs when compared to other sites, with the exception of the Hubbert site. Redeemer is also one of only six documented sites to contain SSLs that were not associated with houses. What all of this implies is that sweat bathing at Redeemer was an important community practice. But why did this proliferation occur? In part, the number of SSLs at Redeemer might be explained by a greater understanding of their contemporaneity. It is impossible to know how many of the SSLs were in use at the same time, or how long each was used for. Basal layer analysis suggests that at least at House 3 SSLs were used less frequently, or for less time, than other SSLs on the site. As a result, it is possible that the residents of Redeemer did not engage in sweat bathing more frequently than is seen on other sites, but they may have built and dismantled SSLs more frequently.

To better understand what the community may have been experiencing, Redeemer must be situated within its regional archaeological context. The Olmstead-Redeemer-Serena community sequence has been previously posited by ASI (2002) and Detritus Consulting (2015). The three village sites are located within 6 km of one another and have been dated to a relatively tight period. Olmstead is a Uren Substage site that dates to between AD 1280 and 1330, and is located 5.85 km east of Redeemer (Detritus Consulting 2015). Redeemer is a terminal Uren Substage site that dates to AD 1320 to 1330 (Woodley 2008; 2012). Finally, the Serena site has been dated to the Middleport Substage (ca. AD 1350) and is located 650 m south of Olmstead (ASI 2004). Other special purpose sites dating to this general period include the Springbrook 1 site (AhGx-110) (Murray 2007), the Wade site (AhGx-19) (Howey 1976), and the Clish site (AhGx-95) (Williamson 1990), all of which may have been used by community members during the Olmstead to Serena settlement sequence. Finally, the Dougherty-Sluis site (AhHa-158) represents a partially excavated village site that postdates Redeemer, and which could potentially predate Serena. It was excavated by Neal Ferris in 1993 (Ferris 2017, personal communication).

Unfortunately, little is known of the community development in this area. Only partial excavations at Olmstead have been completed to date, with excavations revealing overlapping and unclear settlement patterns with some indication that a palisade wall was present. That several

houses appear to overlap suggests successive phases of occupation and reoccupation, possibly by the same community over generations. This was a common practice during the Early Iroquoian period (Williamson 1990; Timmins 1997). One SSL was identified at Olmstead, but did not appear to be associated with any of the houses. At the Redeemer site, the village appears to have been well planned and occupied year-round. All but one of the houses were oriented in a north-west to south-east direction, and the houses were mostly surrounded by a palisade wall. The florescence of SSLs at Redeemer is remarkable when compared to its possible predecessor Olmstead; however, as noted, only a very small portion of the estimated 2.55 hectare site has been excavated, and it is certainly possible that more SSLs were present on the site. Finally, it has been posited that the Serena site settlement occurred after the occupation of the Redeemer site (ASI 2004). Two main building phases were identified as Serena, resulting in the construction of six longhouses. The village plan saw the longhouses mostly oriented along the ridge of a plateau, with some oriented in different directions, and partially sounded by a 140 m long palisade wall. Only three SSLs were identified on the site.

Given the previously identified sites in the area, it has been posited that following the occupation of the Olmstead site, the community moved to settle at the nearby Redeemer site (AhGx-114), and then potentially moved back to the Olmstead area to settle at the Serena site (AhGx-274) (ASI 2004). If the Serena settlement followed immediately after Redeemer, it appears that sweat bathing decreased in importance between the two village occupations. However, it is important to note that much of the surrounding area has not been subject to archaeological investigation, and that other related sites might exist that could more fully delineate this community's development over time. Regardless, this region was well settled from the thirteenth to the fifteenth centuries and would have contained numerous communities who required mechanisms for facilitating inter- and intra-site community networks during such a period of changing lifeways. While little can be inferred about how this community complex developed over time, what is clear is that the Redeemer community presents a unique example of how one community negotiated their environment and community networks in part through the practice of sweat bathing.

6.5 Limitations and Future Research

This research has demonstrated several avenues through which an exploration of SSLs can be completed. Limitations in the analysis primarily revolved around the small sample size provided by the Redeemer excavations. To provide more concrete determinations of SSL variability across sites, a larger sample size could be subject to similar analyses. While only limited inter-site comparisons were completed for this research, analyses of all the documented SSLs would certainly provide much needed interpretative data to better understand how SSLs developed both temporally and regionally. This research provided a preliminary analysis of the temporal and regional SSL data and identified general trends. However, statistical analyses on a larger, more evenly distributed sample would undoubtedly provide a more robust understanding of how SSLs changed through space and over time, and whether the differences are statistically significant. In addition to broader analyses, explorations of SSLs within specific community sequences also have the potential to illuminate the ways in which different communities adapted the use of SSLs to meet their requirements over time.

Another line of inquiry could examine how above ground sweat lodges occur within the archaeological record. Little is known of these features, the existence of which were first posited in 1972 by Tyskka (2015) and which were described as post clusters found within the central corridor of longhouses. Since Tyskka's 1972 paper, there has been little consistency in the documentation of this feature class; while some researchers make note of post clusters in archaeological excavation reports, they often remain unexplained. However, above ground sweat lodges have been documented on sites dating from the thirteenth to the fifteenth centuries (Finlayson 1985; Robertson, Monckton and Williamson 1995; Williams-Shuker 1997; MacDonald and Williamson 2001; Braun 2015), and it is possible that they appear in the archaeological record even prior to that time. A review of archaeological sites containing above ground sweat lodges or post clusters could potentially provide stronger evidence of how these features were used, and how they compare to SSLs. Creese (2011) has completed preliminary research into this topic. A related question raised by this research is how communities were conducting sweat bathing practices prior to development of the SSL, if they were conducting them at all. It is possible that above ground sweat lodges were in use prior to SSLs, and that additional research into this feature class will allow for a more exhaustive exploration of sweat bathing practices in southern Ontario.

A second limitation in this research is that focused solely on sites that contained SSLs, completely excluding villages that dated to the same time period that did not have SSLs. While this division was necessary for the questions posed by this research, a future line of inquiry should focus on sites dating to the thirteenth to fifteenth centuries that did not contain SSLs. Comparisons between sites with SSLs and sites that do not have them could provide valuable information about the differences in these communities and contribute to a greater understanding about SSL development and sweat bathing practices in southern Ontario.

Finally, descendent communities hold a wealth of knowledge about the lives of their ancestors and can offer insights into past community practices that cannot be identified by the archaeological record alone. Collaborative approaches focused on identifying sweat bathing in the archaeological record and on more fully exploring the ways in which sweat bathing functioned is an integral next step that should not be overlooked.

6.6 Conclusions

While previous SSL research has primarily focused on providing descriptions of SSLs and on presenting theories about the functional role of SSLs in Iroquoian society, the current research has established new avenues through which SSLs can be examined. Specifically, this research was aimed at identifying trends in SSL construction, use, and disuse through the application of statistical tests on SSL spatial and morphological attributes and artifact distributions. The results demonstrated that SSLs can provide valuable interpretative data through which the social, political, and built environment of Iroquoian villages can be explored.

With respect to Redeemer, it is clear from this research that sweat bathing was a common community practice, and that the construction of SSLs was standardized across the site. While infilling practices were idiosyncratic, the deposition of artifacts of significance within SSLs during infilling appears to be shared tradition. While on occasion such depositions may have part of a more formalized ritual practices, such as with the owl distal phalanx or the bone bracelet, it is also possible that artifacts of significance were placed within SSLs at their close as an act of remembering. Basal layer data also provided evidence for the length of use of SSLs. SSLs that were external to houses appear to have been used longer, or more frequently, than SSLs that were associated with houses. These unusually placed structures may have served different functions than SSLs that were associated with houses, particularly given concepts of access and public versus

private space. It is possible that the sweat bathing activities that occurred within these structures were performed in a manner that differed from the activities that may have been conducted within the longhouses. Such distinctions may indicate specialized ritual or ceremonial activity that is distinct from sweat bathing focused on social cohesion. This research has also demonstrated that at Redeemer, House 3 may have contained members of the village with a special social standing. In addition to being centrally located, and being one of the longest longhouses, House 3 contained one third of all documented SSLs on the site. Basal layer data and research into the contemporaneity of these structures indicated that SSLs in House 3 were likely built with more frequency than at other houses, with their use being shorter lived. If gatherings or ceremonies involving sweat bathing were held at House 3 more frequently than at other houses, the SSLs would likely have been constructed on an as-needed basis. The turtle shell recovered from one SSL at the north end of House 3 could provide evidence of clan membership, although this is admittedly speculative.

Finally, preliminary research into temporal and regional variability has demonstrated that while certain trends are present, the frequency with which SSLs appear on sites, and the manner in which they appear, varies from site to site and region to region. This finding suggests that communities had differing needs for SSLs, and that the increased importance of sweat bathing within specific communities may have been more strongly influenced by internal and external circumstances as opposed to following more generalized temporal and regional patterns. Consequently, it is proposed that research into SSLs within a series of related villages could provide insight into the lived experiences of a community over generations.

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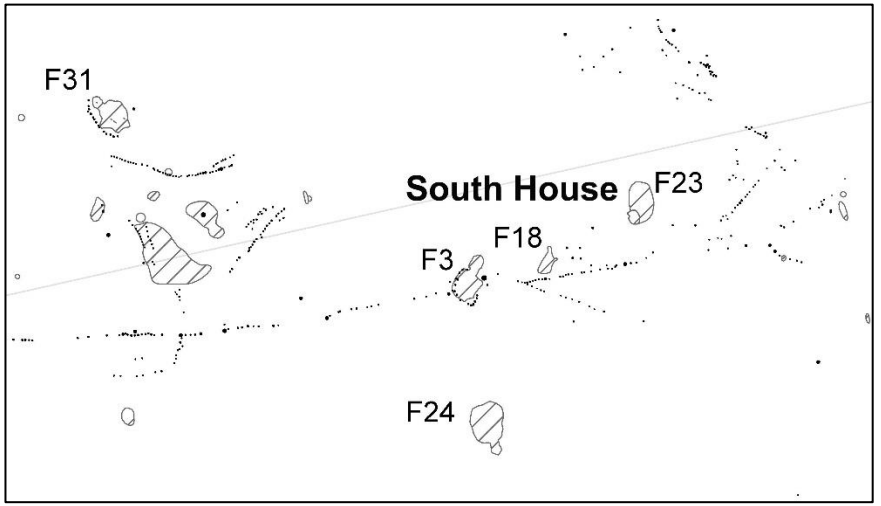
APPENDICES

APPENDIX I: Redeemer Site SSL Data Sheets

Feature 3

Location	
Feature #	3
Location	South House
Comments	Appended to possible south wall; rounded square in plan view; outer ring demonstrates possible bark weaving around posts, possible remnants of superstructure; ash pit (F3A) at bottom of feature in NE quad; artifacts of note include a ceramic pipe bowl recovered from the basal layer, a second ceramic pipe bowl recovered from the ramped entrance in Refuse Layer 1, and stone pipe stem turned pendant recovered from the ramped entrance in Refuse Layer 1.



Stratigraphy

Layer	Description	Thickness (cm)	Above	Below
Basal Layer 1	Dark grey-brown silty loam with ash and charcoal inclusions (L6)	4	Subsoil Construction Layer 1	Infill Layer 1
Infill Layer 1	Light to medium brown sandy soil with charcoal inclusions (L3, L5, L9 and L16)	53	Basal Layer	Infill Layer 2 Infill Layer 3 Refuse Layer 1
Infill Layer 2	Dark brown silty loam with inclusions of charcoal and fire cracked rock (L4 and L8); lenses located within Infill Layer 1	8	Infill Layer 2	Infill Layer 2
Infill Layer 3	Very dark brown to black silty loam with charcoal inclusions (L15), located in ramped entrance only	11	Infill Layer 1	Refuse Layer 1
Infill Layer 4	Located in east half of feature where preservation was poor; includes a medium brown coarse sand with yellow sandy lenses (L11) and light grey brown silt (L10)	25	Basal Layer 1	Infill Layer 1
Refuse Layer 1	Very dark brown sandy loam with significant charcoal inclusions (L2)	22	Infill Layer 1	Refuse Layer 2
Refuse Layer 2	Light yellow to grey brown sandy with medium brown mottling (L1)	5	Refuse Layer 1	n/a

Construction Layer 1	Light yellow sand between basal layer and subsoil (red brown sand); in ramped entrance called L14, at interface between ramped entrance and body of feature called L12 and L13	20	Subsoil (L7, L17)	Basal Layer
Feature 3A	Square ash pit below basal layer in northeast quadrant of feature; contained three corn kernels and charred wood	4	Subsoil (L7, L17)	Basal Layer

Plan and Profile Drawings

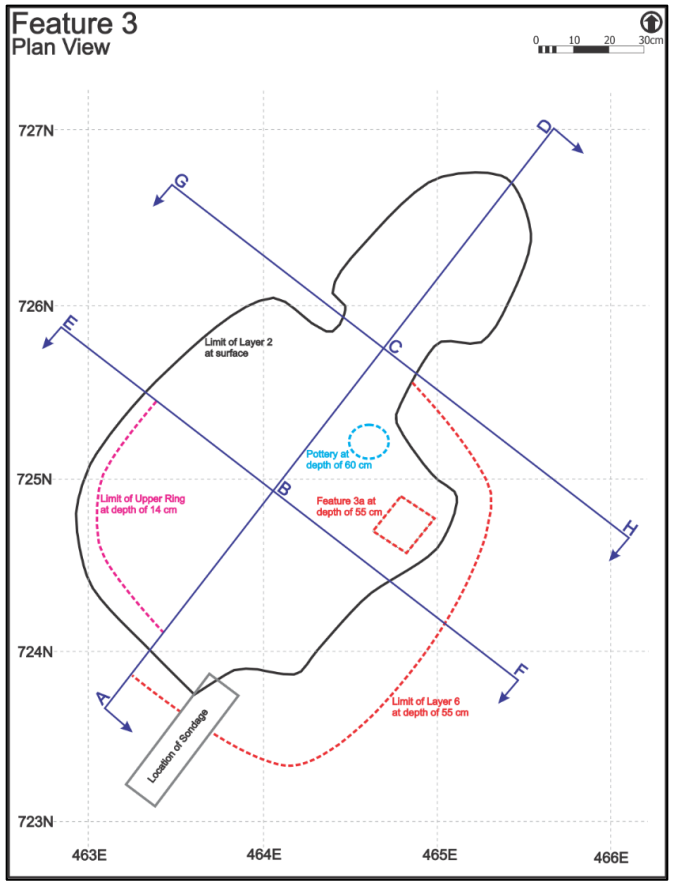


Figure 1 Feature 3 Plan View

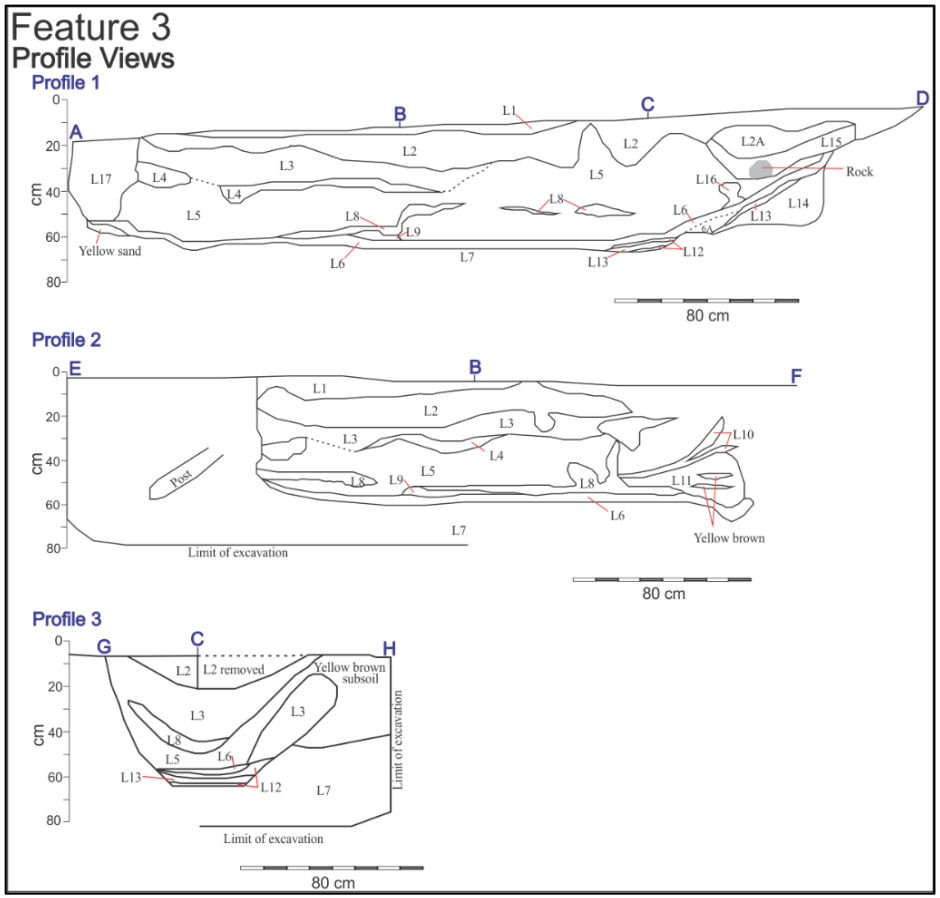
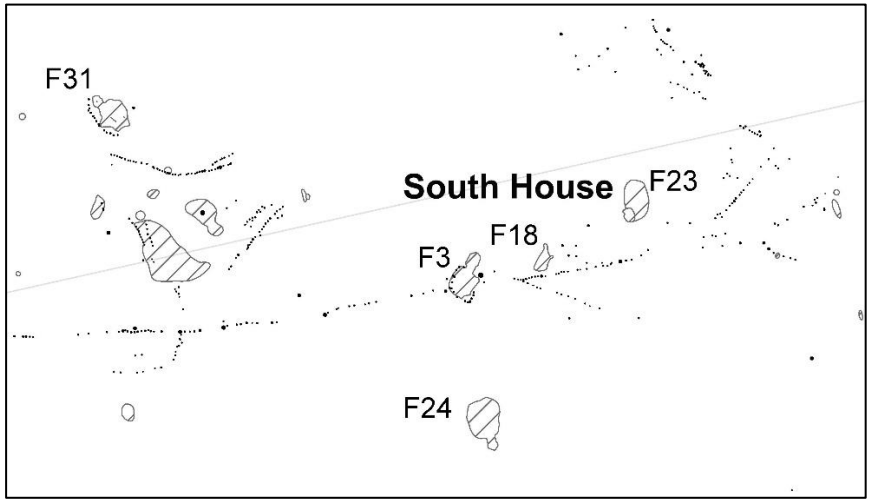


Figure 2 Feature 3 Profiles

Feature 18

Location	
Feature #	18
Location	South House
Comments	Possibly in bunk line of South House; rounded rectangle in plan view; severe rodent disturbance below refuse layer has destroyed all data associated with this feature; function was determined based on surface shape; least convincing SSL; only three artifacts recovered from feature, none of which were diagnostic



Stratigraphy

Layer	Description	Thickness (cm)	Above	Below
Refuse Layer 1	Very dark brown to black sandy loam with significant charcoal inclusions (L2 and L3)	28	n/a	Rodent Disturbance
Rodent Disturbance	Severe rodent disturbance including tunnels and burrows has completed destroyed all layers below Refuse Layer 1; data incomplete (L4-L11)	60	n/a	Refuse Layer 1

Plan and Profile Drawings

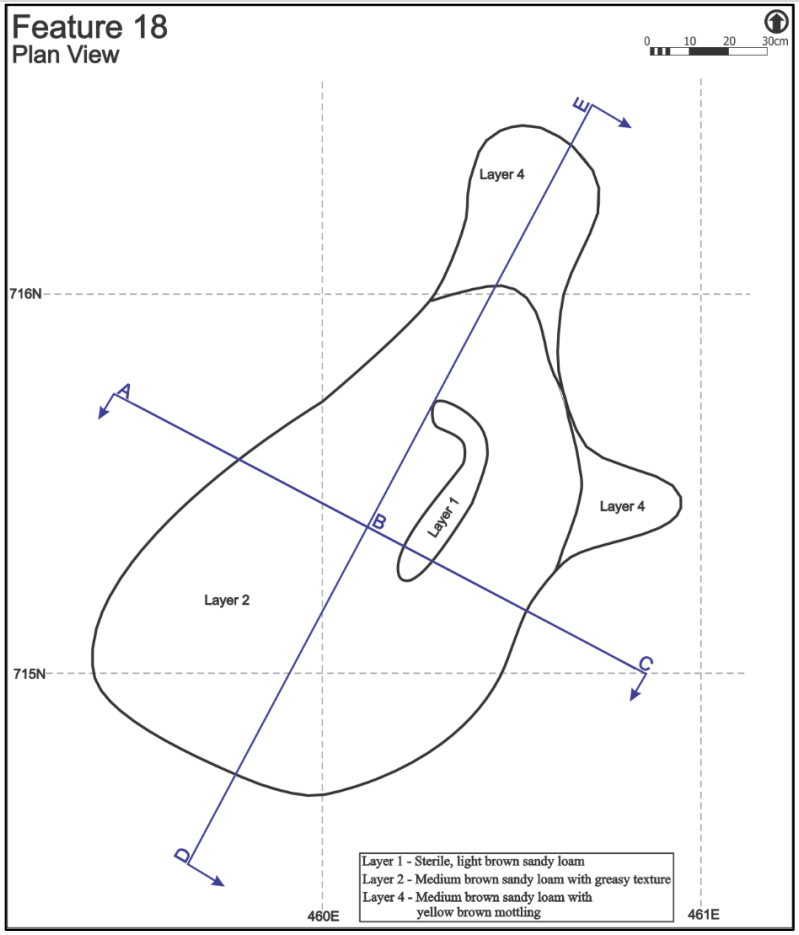


Figure 3 Feature 18 Plan View

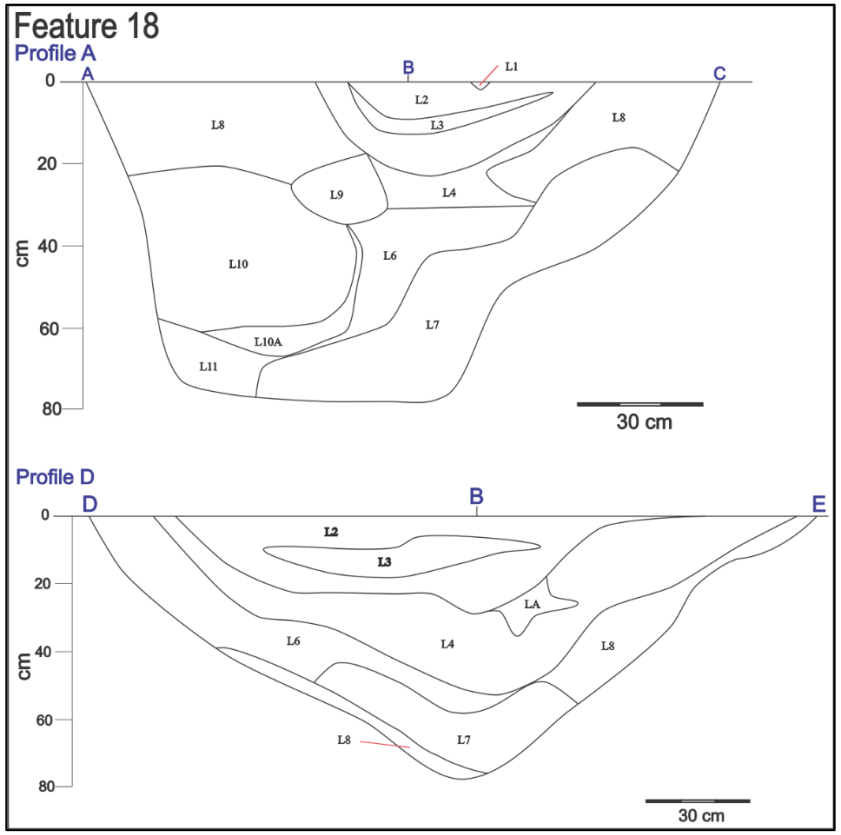
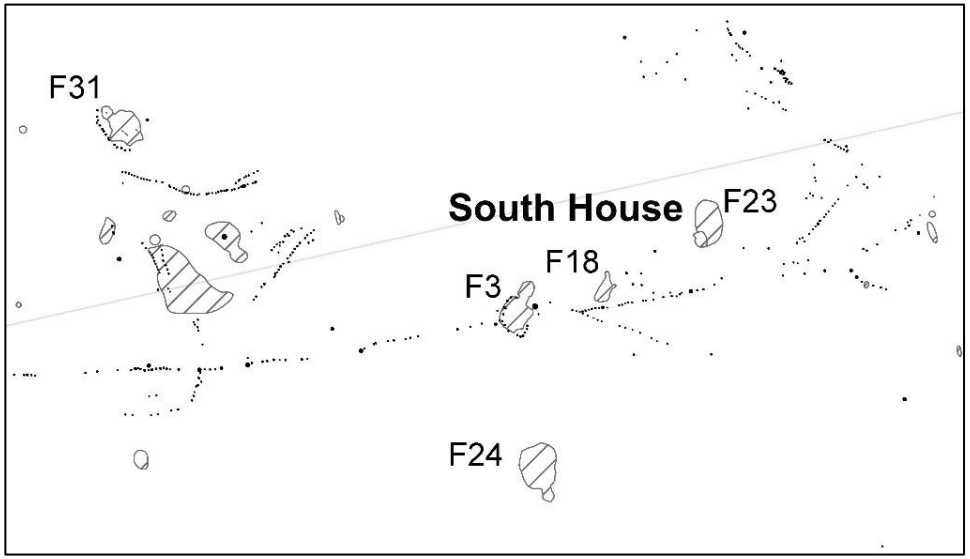


Figure 4 Feature 18 Profiles

Feature 23

Location	
Feature #	23
Location	South House
Comments	Appended to possible north wall of South House, rounded square in plan view; upper refuse layer was absent leading to difficult identification in the field; only ramped entrance visible on surface; body of feature identified later in excavation, at which time part of the body had been unknowingly excavated; no photographs of feature body; no artifacts of significance were recovered from this feature; a single Iroquois Linear vessel was recovered from Feature 23 and mends with a rim from Feature 3, an SSL appended to the south wall of the possible South House.



Stratigraphy

Layer	Description	Thickness (cm)	Above	Below
Basal Layer	Dark grey sandy clay with ash and charcoal inclusions (L5 and L6)	7	Construction Layer 1	Infill Layer 1
Infill Layer 1	Medium brown sandy clay with charcoal inclusions (L3, L4, L9, and L10) with pocket of yellow brown sand (L8)	30	Basal Layer	Infill Layer 2 Infill Layer 3
Infill Layer 2	Yellow brown sandy clay with gravel inclusions (L2)	13	Infill Layer 2	Infill Layer 3
Infill Layer 3	Medium brown sandy loam with charcoal inclusions (L1); indistinguishable from surrounding subsoil	37	Infill Layer 1 Infill Layer 2	n/a
Construction Layer 1	Red brown sand layer commonly seen across site below basal layer (L7), and above lenses of yellow brown sand (L11-L14)	6	Subsoil	Basal Layer

Plan and Profile Drawings

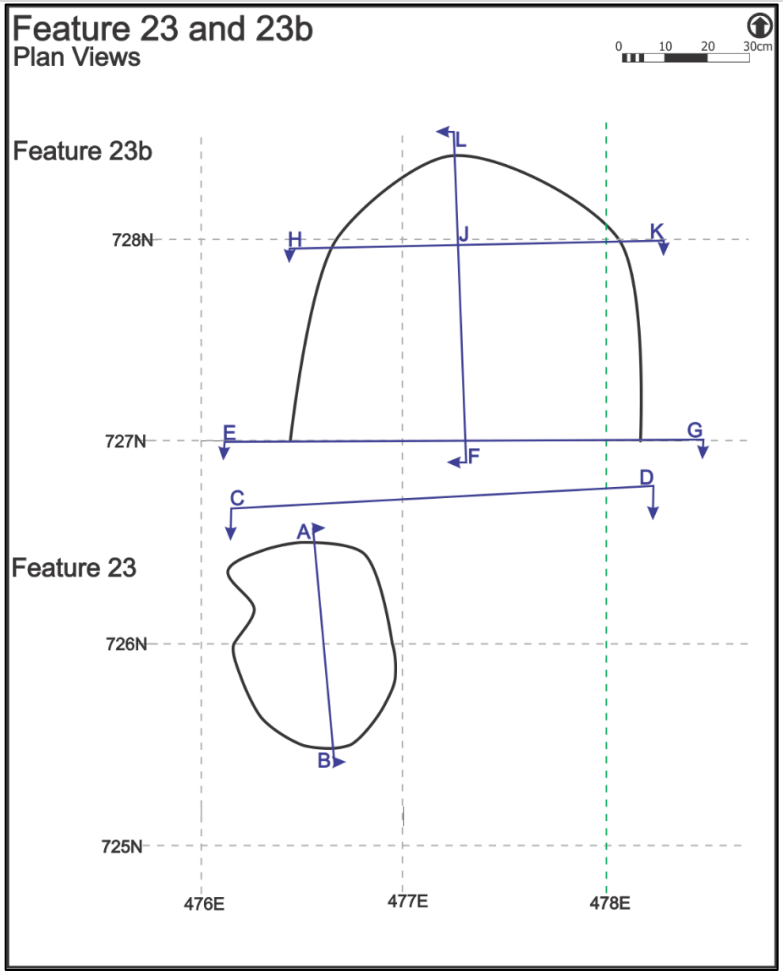


Figure 5 Feature 23 Plan View

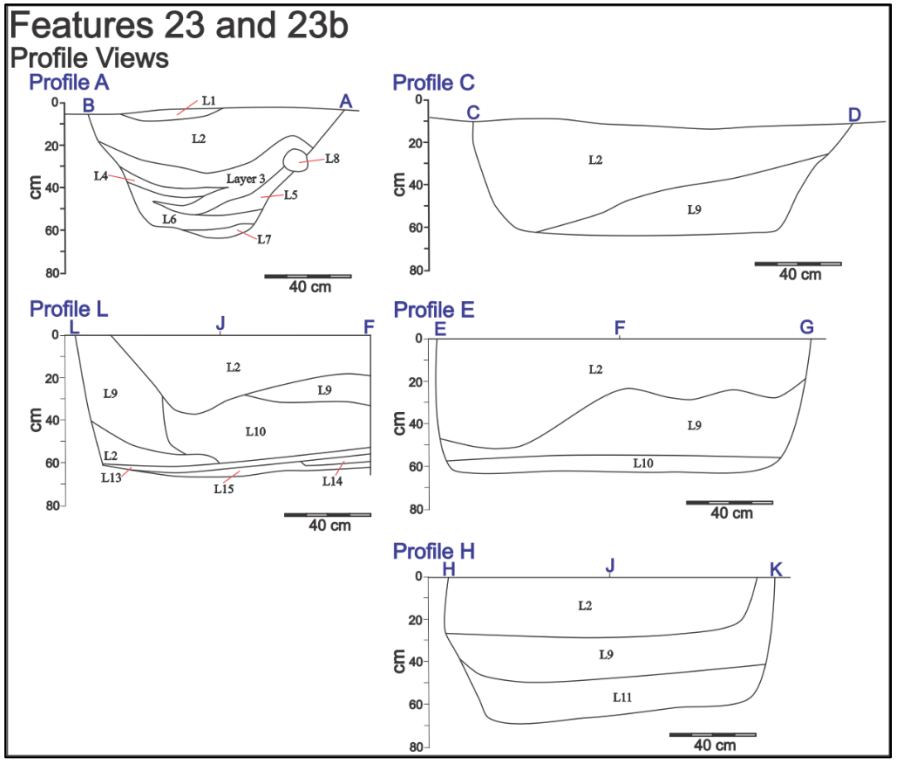
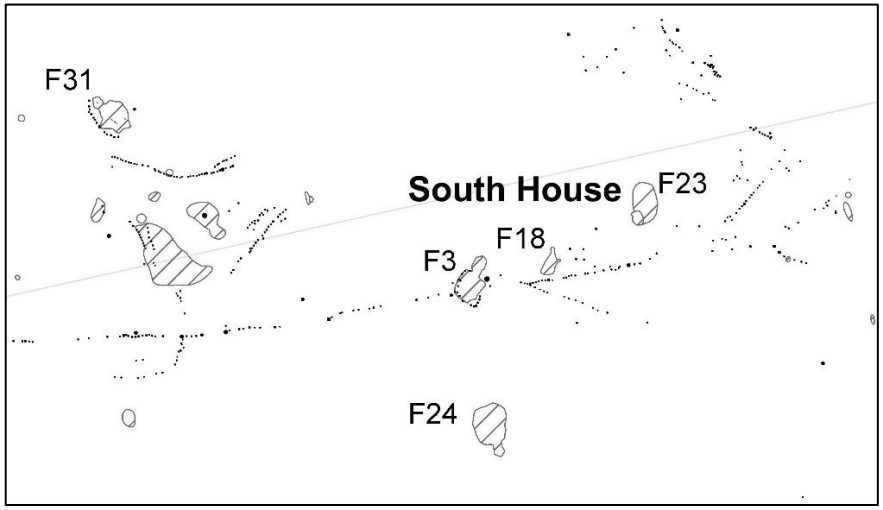


Figure 6 Feature 23 Profiles

Feature 24

Location	
Feature #	24
Location	External – south of south palisade wall
Comments	Not associated with a house; rounded square in plan view; outer ring demonstrates possible decomposition of bark weaving, suggestive of superstructure construction; while no posts identified, circular charcoal chunks were noted as part of Construction Layer 2; a distal phalanx from an owl recovered from Basal Layer



Stratigraphy

Layer	Description	Thickness (cm)	Above	Below
Basal Layer	Light to dark grey grown silty loam with ash and charcoal inclusions (L7 and L9); thicker and more charcoal inclusions in ramped entrance and included fire cracked rock	12	Subsoil	Infill Layer 1
Infill Layer 1	Medium grey silty loam with charcoal inclusions (L4) interspersed with sterile yellow sandy subsoil (L6), located in ramped entrance only	30	Basal Layer	Infill Layer 2
Infill Layer 2	Medium brown sandy loam with charcoal inclusions (L3), includes pockets of sterile yellow sandy subsoil (L6)	64	Basal Layer Infill Layer 1	Refuse Layer 1
Refuse Layer 1	Black sandy loam with significant charcoal inclusions (L2)	9	Infill Layer 2	Refuse Layer 2
Refuse Layer 2	Dark brown sandy loam with charcoal inclusions (L1)	11	Refuse Layer 1	n/a
Construction Layer 1	Red brown sand with pea sized gravel inclusions below basal layer in body and ramped entrance (L8)	6	Subsoil	Basal Layer

Construction Layer 2	Dark brown to very dark brown silty loam with significant charcoal inclusions (L5 and L15, not seen in profile); represents decomposition of superstructure woven around post moulds (8 circular charcoal deposits); located around perimeter of feature (discontinuous); depth measurements vary	5	Variable	Variable

Plan and Profile Drawings

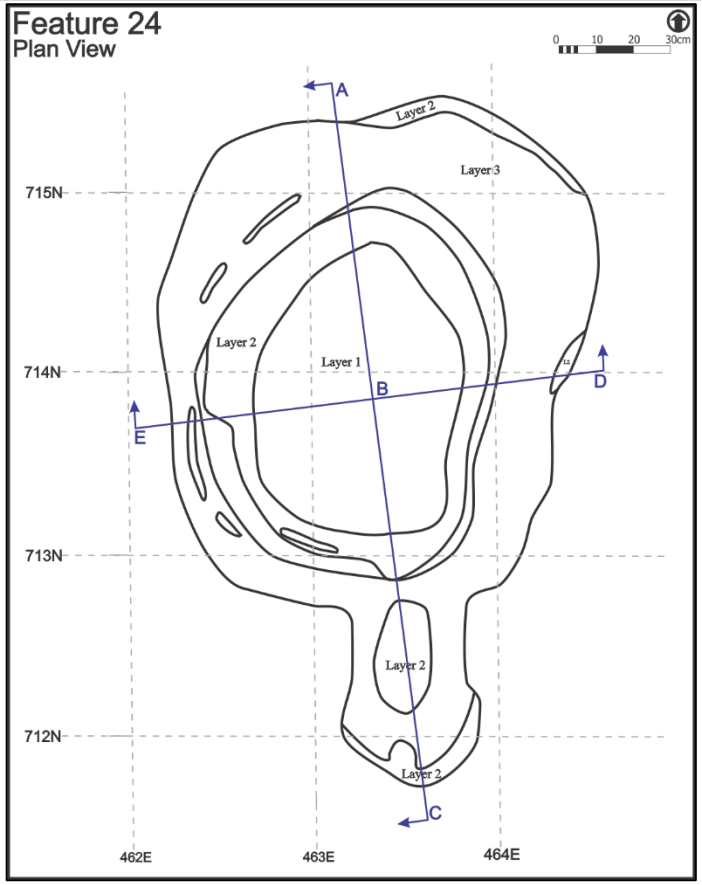


Figure 7 Feature 24 Plan View

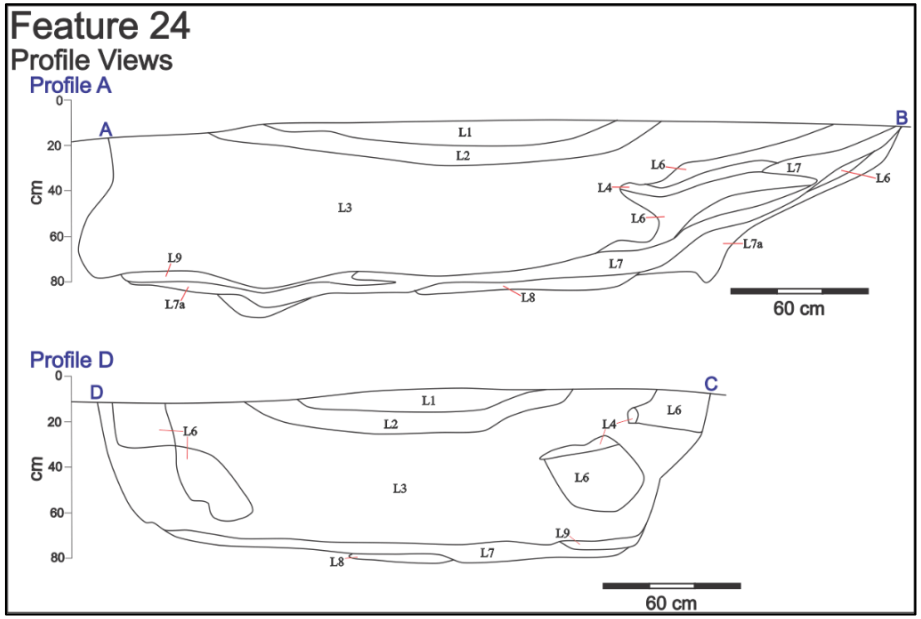
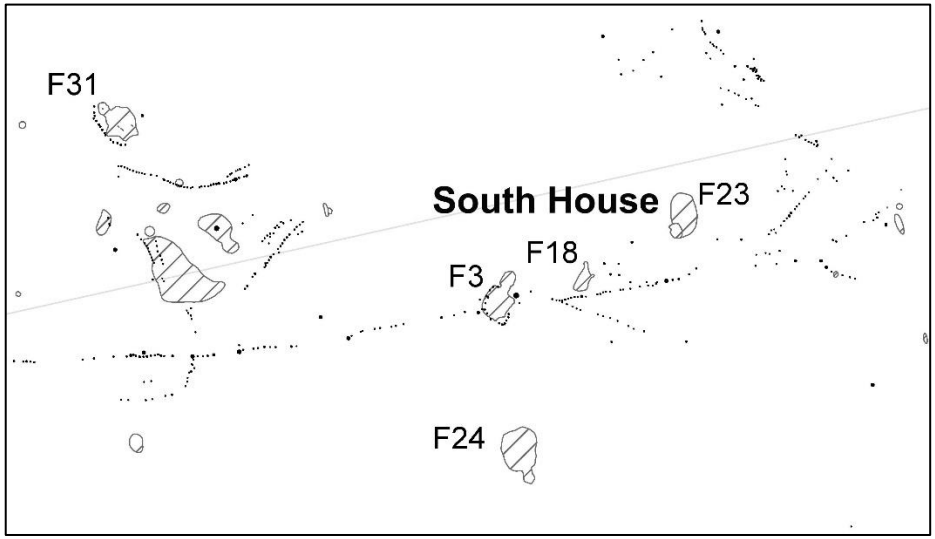


Figure 8 Feature 24 Profiles

Feature 31

Location	
Feature #	31
Location	External – south of access road
Comments	Not associated with a house; rounded square to irregular plan view; line of posts outside feature along western margins is possible wind break; pockets of fire reddened soil found centrally within body at depths of 25 cm and 37 cm below surface (secondary deposits); artifacts of note include a ceramic pipe bowl with a human effigy recovered from Infill Layer 2 (near the Basal Layer) and a ceramic pipe bowl recovered from Refuse Layer 2.



Stratigraphy

Layer	Description	Thickness (cm)	Above	Below
Basal Layer	Dark grey black sandy loam with charcoal and ash inclusions (L6) and ash deposit (L5) located discontinuously on surface of L6	9	Subsoil	Infill Layer 1
Infill Layer 1	Light brown to yellow brown sandy soil with charcoal inclusions (L4)	37	Basal Layer	Infill Layer 2
Infill Layer 2	Medium grey brown sandy loam with charcoal inclusions (L3)	20	Basal Layer Infill Layer 2	Refuse Layer 1
Refuse Layer 1	Black sandy loam with significant charcoal inclusions (L2)	18	Infill Layer 2	Refuse Layer 2
Refuse Layer 2	Medium grey brown loam with charcoal inclusions (L1)	16	Refuse Layer 1	n/a

Plan and Profile Drawings

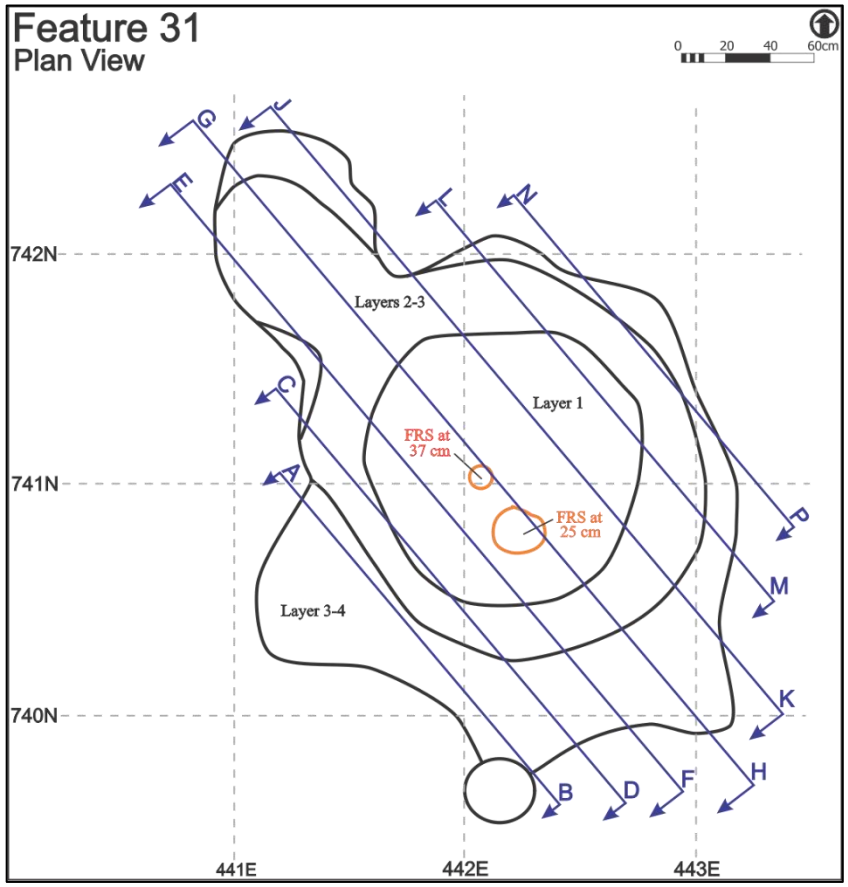


Figure 9 Feature 31 Plan View

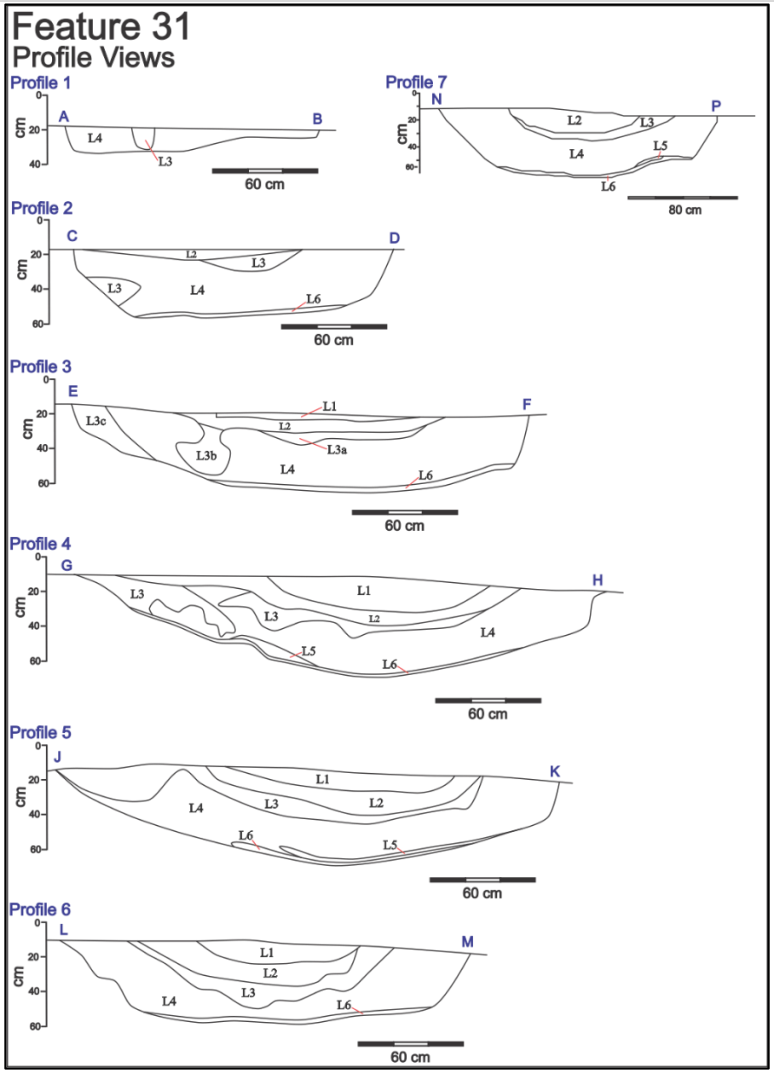
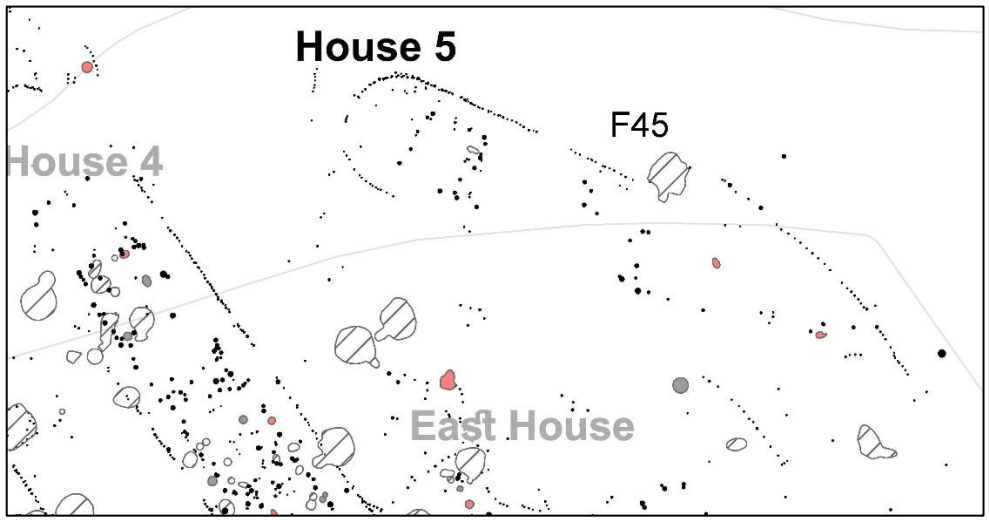


Figure 10 Feature 31 Profiles

Feature 45

Location	
Feature #	45
Location	House 5
Comments	Appended to north wall; rounded square in plan view; very shallow, poor preservation in this portion of site; differential area of drying on surface of L2; possible that only the bottom of feature is intact; two items of note include a deer scapula and tooth recovered from the southeast quadrant of the feature positioned flat on surface of L2, the potential basal layer; excavators noted that it did appear not that scapula and tooth were present due to the rodent activity, but were placed before infilling and rodent activity



Stratigraphy

Layer	Description	Thickness (cm)	Above	Below
Basal Layer	Dark brown to black ashy loam with charcoal inclusions (L2), located above subsoil (L3 and L4)	12	Subsoil (L3 and L4)	Infill Layer 1
Infill Layer 1	Light brown to yellow brown sandy soil with charcoal inclusions (L1)	5	Basal Layer	n/a
Rodent Disturbance	Layers associated with the rodent burrow (L5 and L6), documented through and below the basal layer.	Variable	n/a	Basal Layer

Plan and Profile Drawings

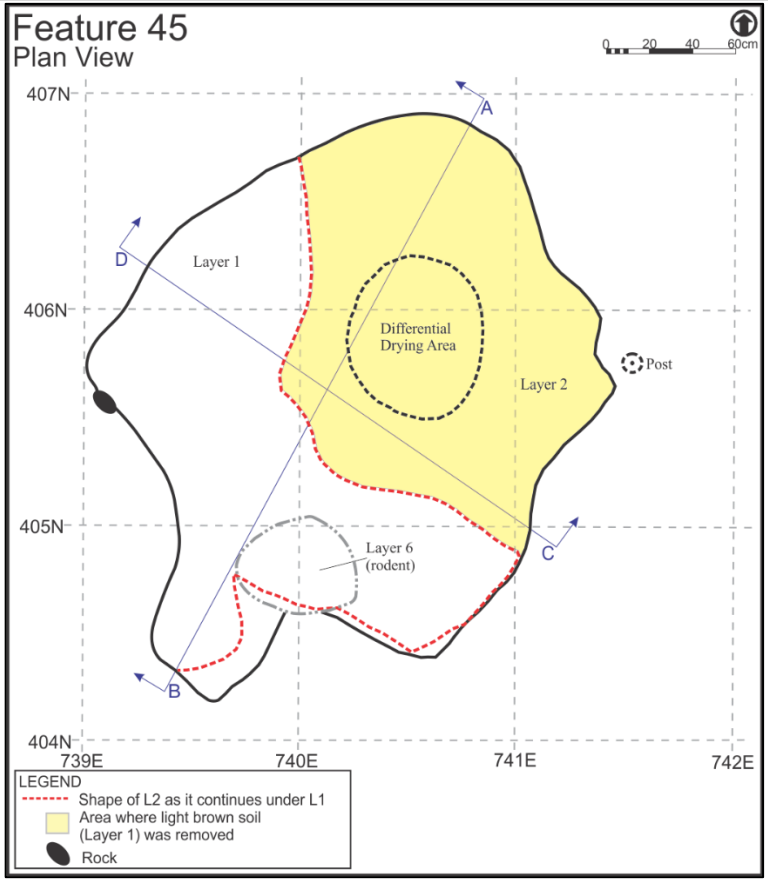


Figure 11 Feature 45 Plan View

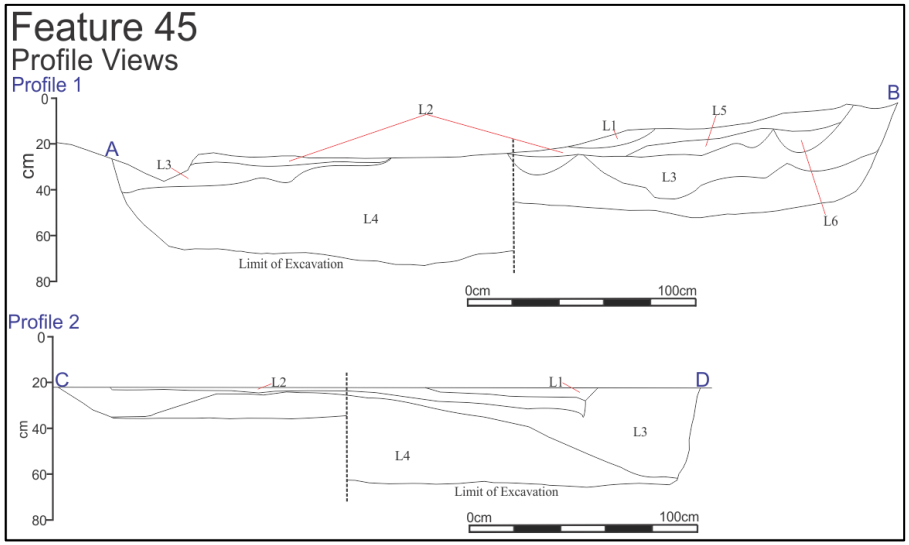
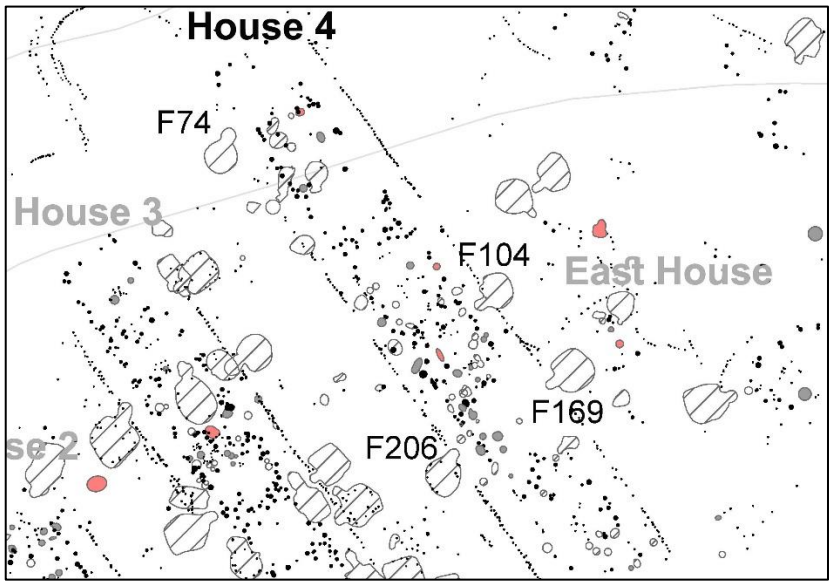


Figure 12 Feature 45 Profiles

Feature 74

Location	
Feature #	74
Location	House 4
Comments	Appended to west wall; circular in plan view; infill indistinguishable from surrounding subsoil expect at ramped entrance; very few artifacts; may represent short term use; multiple profiles drawn to assist in identifying extent of feature; coarse red sand (CRS) and friable red sand (FRS) location below feature above subsoil; no artifacts of significance were recovered from this feature



Stratigraphy

Layer	Description	Thickness (cm)	Above	Below
Basal Layer	Dark brown clay loam with ash and charcoal inclusions (L2)	6	Subsoil Infill Layer 1	Infill Layer 1
Infill Layer 1	Light grey ash layer in ramped entrance (L3), possible continuation of basal layer	10	Subsoil Basal Layer	Infill Layer 2
Infill Layer 2	Light brown to yellow brown clay loam with charcoal inclusions (L1)	24	Infill Layer 1	n/a
Infill Layer 3	Yellow brown clay loam with charcoal inclusions (L4), likely a natural layer, sterile	10	Subsoil Infill Layer 1	n/a

Plan and Profile Drawings

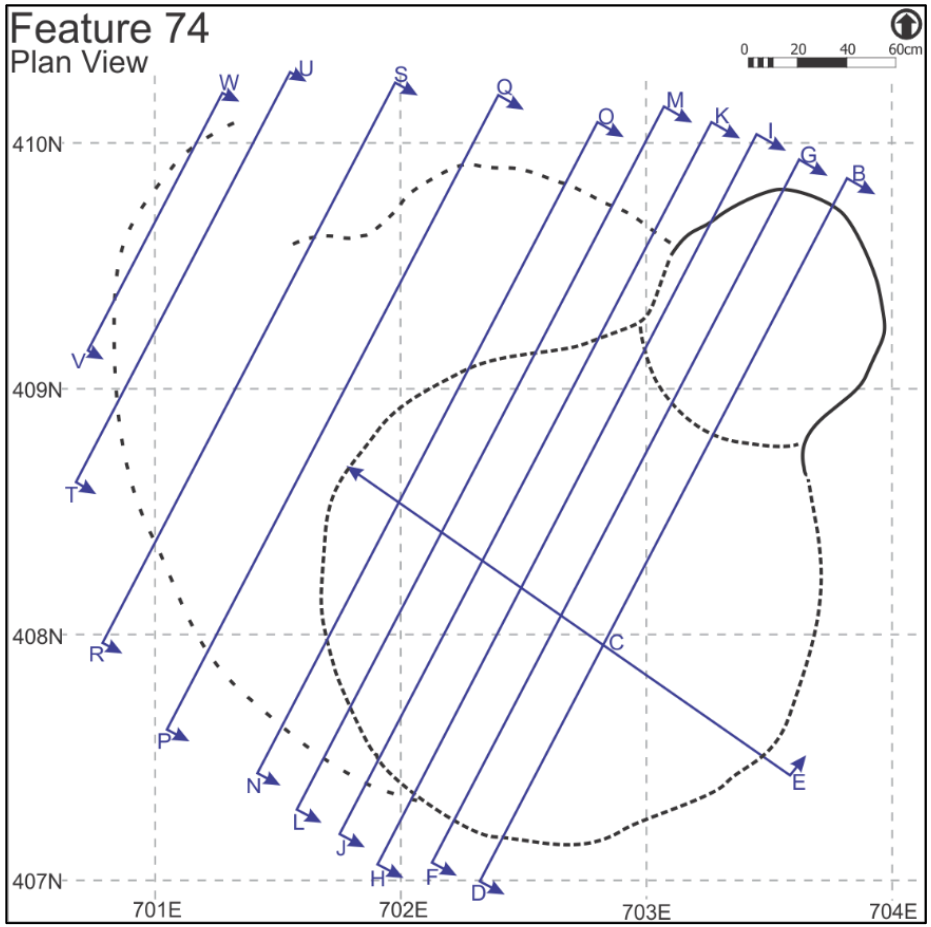


Figure 13 Feature 74 Plan View

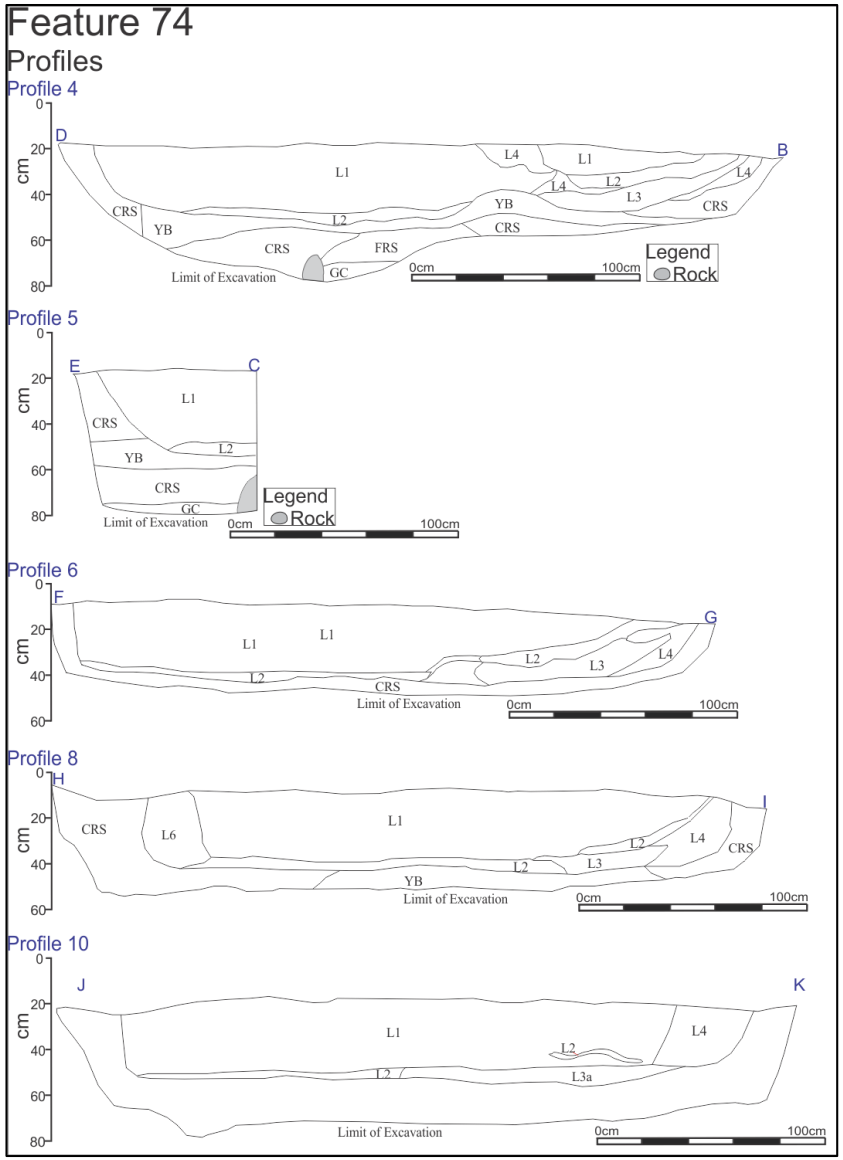


Figure 14 Feature 74 Plan View

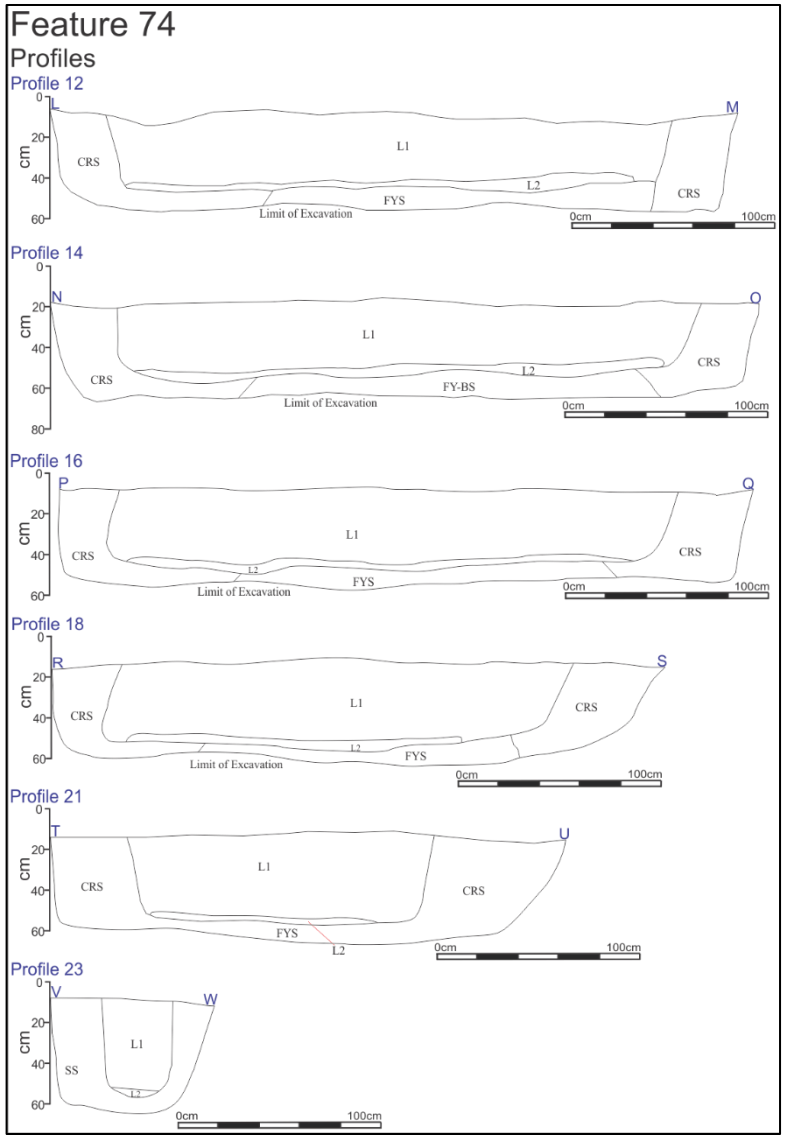
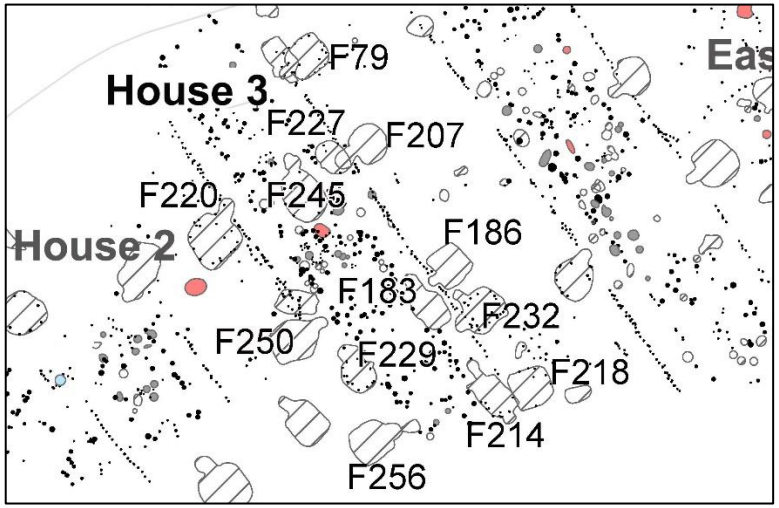


Figure 15 Feature 74 Profiles

Feature 79

Location	
Feature #	79
Location	House 3
Comments	Appended to east wall; rounded square in plan view; ramped entrance excavated as part of F97 and F133, missing ramped entrance data; very poor notes; one ceramic vessel mends with F207, one with F218; artifacts of note include a ceramic pipe bowl from Infill Layer 3, a ceramic pipe mouth from Infill Layer 1, and a bone bead from Infill Layer 1



Stratigraphy

Layer	Description	Thickness (cm)	Above	Below
Basal Layer	Grey sand with significant ash and charcoal inclusions (L11 and L14), separated in some areas by yellow sand (L12 and L13)	7	Subsoil (L15-L18)	Infill Layer 1
Infill Layer 1	Black sandy loam with significant charcoal inclusions (L9), with pocket of yellow sand (L8)	6	Basal Layer 1	Infill Layer 2
Infill Layer 2	Dark grey sandy loam with charcoal and ash inclusions (L7)	10	Infill Layer 1	Infill Layer 3
Infill Layer 3	Medium grey brown sandy loam (L5 and L6)	14	Infill Layer 2	Infill Layer 5
Infill Layer 4	Medium dark brown sandy loam (L3), lens within Infill Layer 5	10	Infill Layer 5	Infill Layer 5
Infill Layer 5	Yellow to light brown sandy subsoil (L2 and L4)	44	Infill Layer 3 Infill Layer 4	Refuse Layer 1
Refuse Layer 1	Black sandy loam with significant charcoal inclusions (L1)	5	Infill Layer 5	n/a

Plan and Profile Drawings

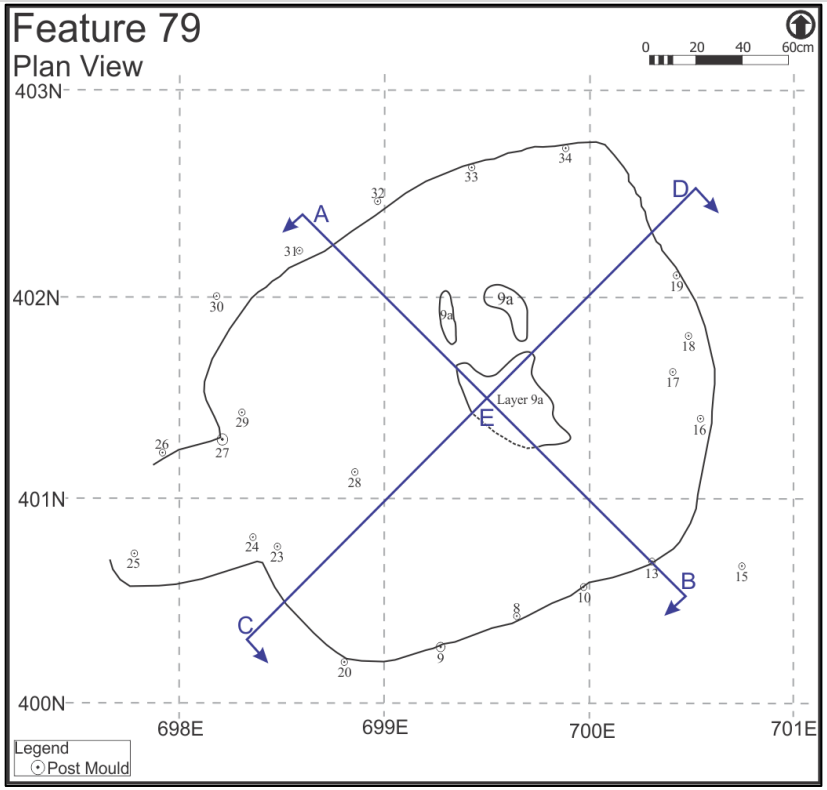


Figure 16 Feature 79 Plan View

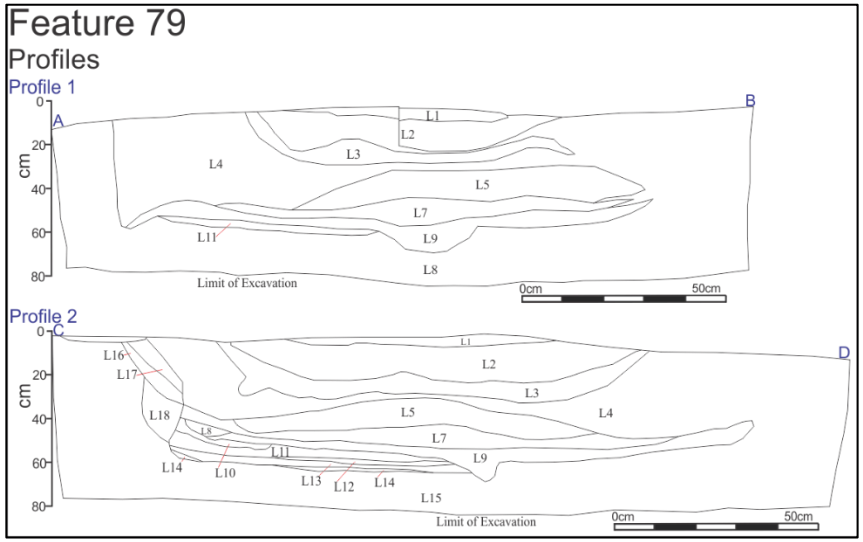
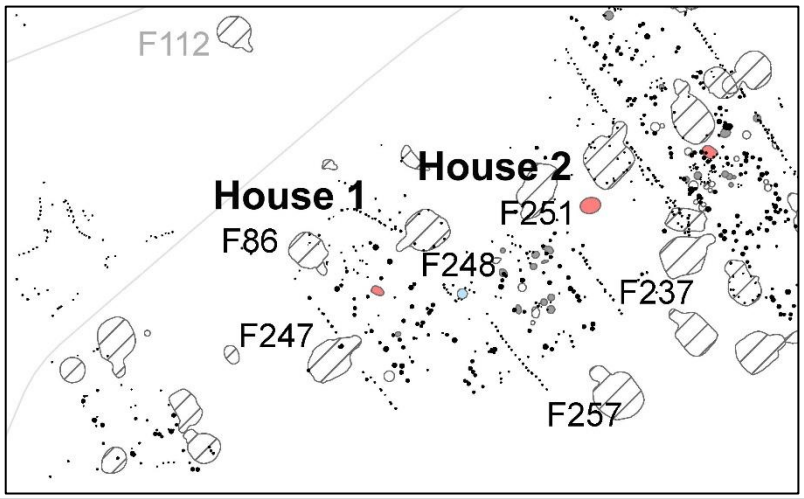


Figure 17 Feature 79 Profiles

Feature 86

Location	
Feature #	86
Location	House 1
Comments	Appended to north end cubicle; circular in plan view; artifacts of note include three ceramic pipe fragments (two from Infill Layer 2 and one from Refuse Layer 1), a crinoid fossil (Infill Layer 2, L12 ash deposit), a complete copper awl (Infill Layer 2, L5 head), five bone awls, two bone toggles, and five bone beads



Stratigraphy

Layer	Description	Thickness (cm)	Above	Below
Basal Layer	Dark brown loam with significant ash and charcoal inclusions (L7, L10, and L11)	7	Subsoil (L13)	Infill Layer 1
Infill Layer 1	Medium brown loam mottled with yellow brown subsoil inclusions (L6 and L9)	58	Basal Layer	Infill Layer 2
Infill Layer 2	Dark brown and black sandy loam with charcoal and ash deposits (L8); includes ash deposit (L12) and fire-reddened soil and fire-cracked rock	16	Infill Layer 1	Infill Layer 3
Infill Layer 3	Medium brown sandy loam intermixed with yellow brown subsoil (L3, L4, and L5)	32	Infill Layer 2	Infill Layer 4
Infill Layer 4	Grey to dark brown loam with ash and charcoal deposits (L2)	12	Infill Layer 3	Refuse Layer 1
Refuse Layer 1	Dark brown to black sandy loam with charcoal inclusions (L1)	8	Infill Layer 3	n/a
Rodent Disturbance	Layers associated with the rodent burrow (L5), documented at surface, through feature, and below the basal layer.	Variable	n/a	n/a

Plan and Profile Drawings

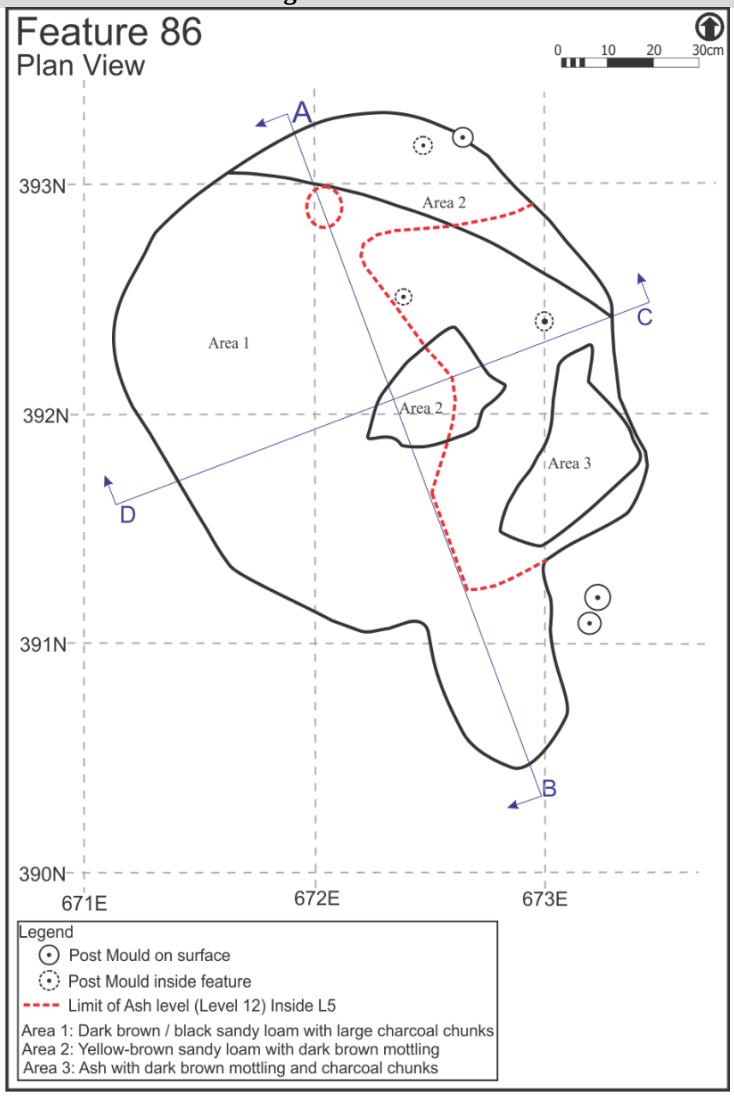


Figure 18 Feature 86 Plan View

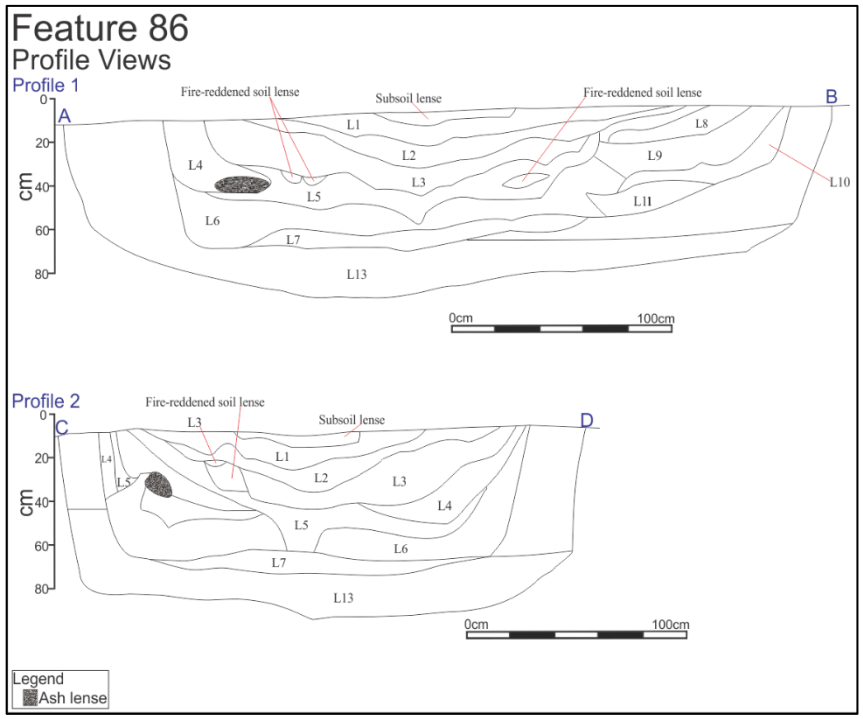
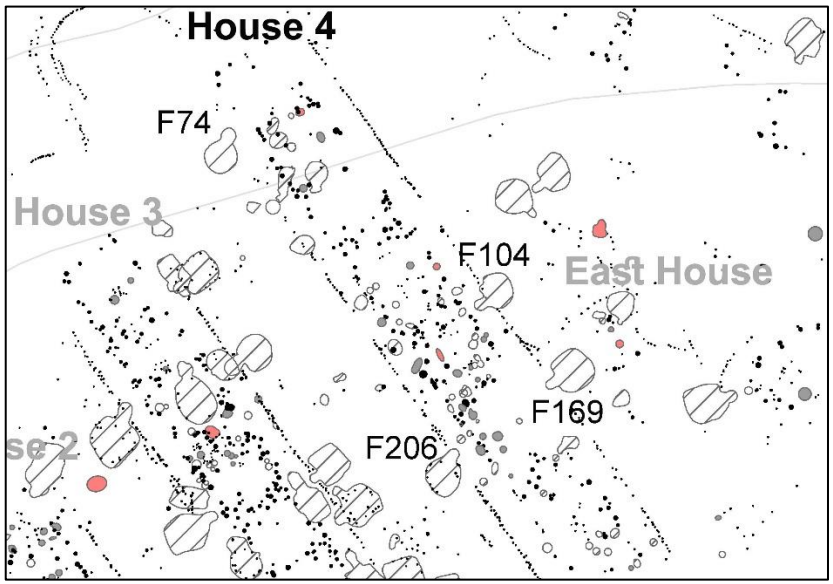


Figure 19 Feature 86 Profiles

Feature 104

Location	
Feature #	104
Location	House 4
Comments	Appended to east wall of House 4; circular in plan view; artifacts of note include a steatite bead and a steatite pendant (Infill Layer 1, L3) and a cylindrical ceramic pipe bowl with punctates (Infill Layer 2, L4)



Stratigraphy

Layer	Description	Thickness (cm)	Above	Below
Basal Layer	Grey sandy loam with ash deposits (L7 and L8) over a thin black sandy loam with charcoal deposits (L9)	7	Subsoil (L10)	Infill Layer 1
Infill Layer 1	Dark brown sandy loam with charcoal deposits (L3, L5, L6, and L13). In the northwest quadrant, Infill Layer 1 was separated from the basal layer by a thin (9 cm), localized grey ash deposit.	52	Basal Layer	Infill Layer 2
Infill Layer 2	Yellow brown sandy loam subsoil with charcoal inclusions (L4)	38	Infill Layer 1	Infill Layer 3
Infill Layer 3	Yellow brown sandy loam subsoil with charcoal inclusions (L11 and L12)	38	Infill Layer 2	Refuse Layer 1
Refuse Layer 1	Black sandy loam with charcoal inclusions and fire-cracked rock (L2 and L15)	7	Infill Layer 3	n/a
Construction Layer 1	Medium brown sand, construction trench around circumference of pit, and at bottom of ramped entrance (L1 and L14)	63	n/a	Infill Layer 1

Rodent Disturbance	Rodent disturbance (L3A) noted within Infill Layer 1

Plan and Profile Drawings

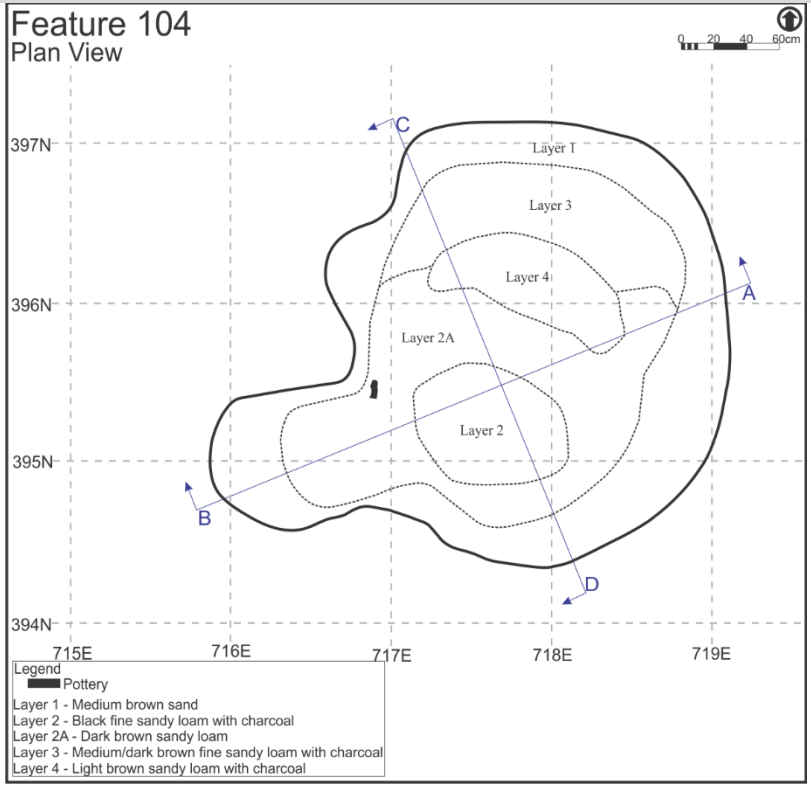


Figure 20 Feature 104 Plan View

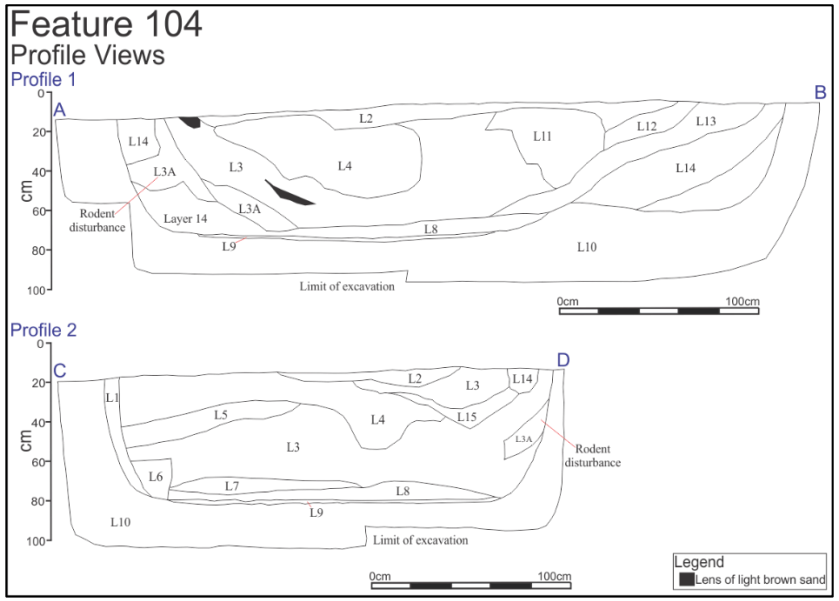
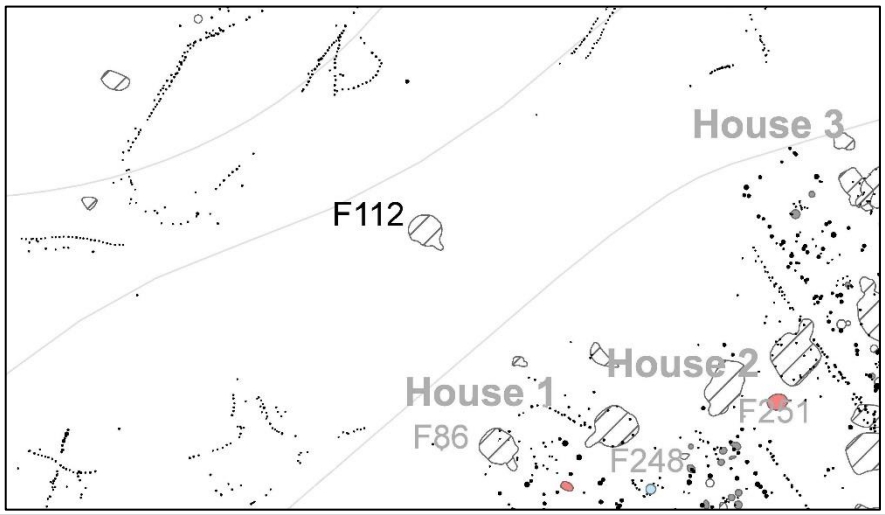


Figure 21 Feature 104 Profiles

Feature 112

Location	
Feature #	112
Location	External – north of houses and south of north palisade wall
Comments	Not associated with a house; circular in plan view; possible deflation or truncation of this portion of the site; possible that only the bottom part of Feature 112 remains; significant rodent disturbance noted in east half; only one profile found in notes; no artifacts of significance were recovered from this feature



Stratigraphy

Layer	Description	Thickness (cm)	Above	Below
Basal Layer	Dark brown sandy loam with ash and charcoal inclusions (L3); note, located above coarse red sand (L4)	10	Subsoil	Infill Layer 1
Infill Layer 1	Yellow brown sandy subsoil with charcoal inclusions (L2)	52	Basal Layer	Refuse Layer 1
Refuse Layer 1	Dark brown to brown sandy loam with charcoal inclusions (L1)	7	Infill Layer 1	n/a

Plan and Profile Drawings

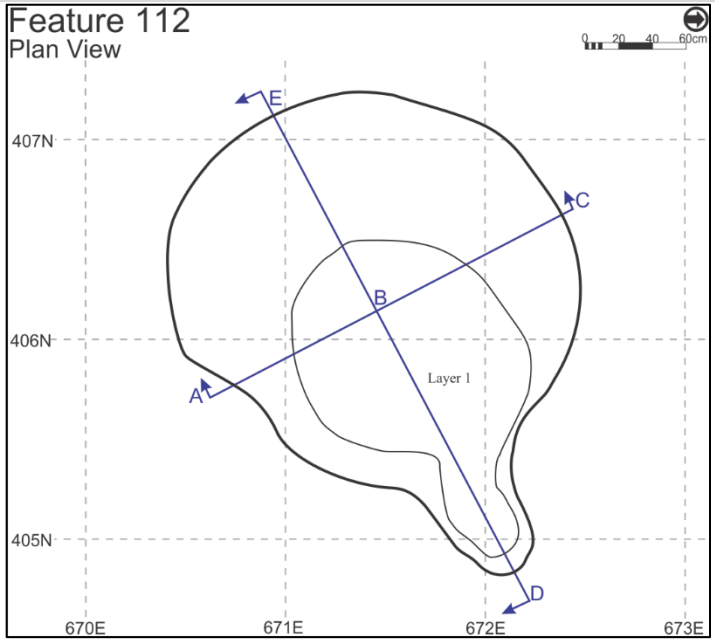


Figure 22 Feature 112 Plan View

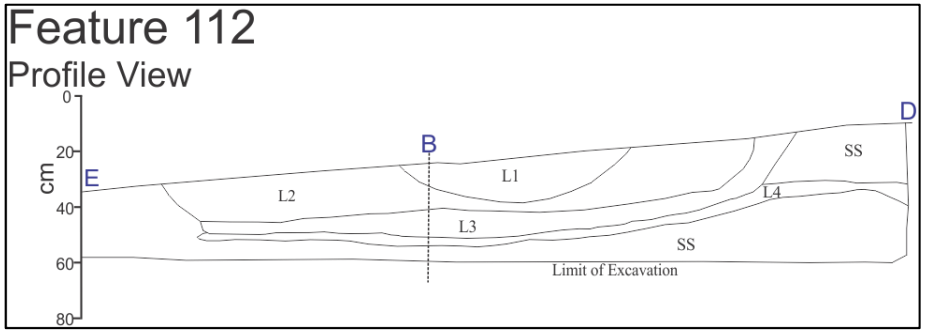


Figure 23 Feature 112 Profile

Feature 120

Location	
Feature #	120
Location	Northwest House
Comments	Appended to east wall of house near end cubicle; artifacts of note include one ceramic pipe stem (Refuse Layer 1, ramped entrance); one Ontario Horizontal vessel (Infill Layer 1, L6), mends with a rim sherd from a lower level of Feature 86 (SSL in House 1), suggesting the two SSLs may have been infilled at around the same time

Stratigraphy

Layer	Description	Thickness (cm)	Above	Below
Basal Layer	Dark grey to black ashy sand with charcoal inclusions (L7)	8	Subsoil	Infill Layer 1
Infill Layer 1	Medium grey-brown sandy loam with ash and charcoal inclusions (L6)	34	Basal Layer	Infill Layer 2 Infill Layer 3 Refuse Layer 1
Infill Layer 2	Black sandy loam with charcoal and subsoil inclusions (L9)	12	Basal Layer	Infill Layer 2
Infill Layer 3	Dark grey to brown sandy loam with charcoal and ash inclusions (L5)	10	Infill Layer 1, Infill Layer 2	Refuse Layer 1
Infill Layer 4	Medium grey-brown sandy loam with ash and charcoal inclusions, significant gravel inclusions (L3); Sterile subsoil sits on surface (L1)	50	Infill Layer 1	Infill Layer 1
Refuse Layer 1	Dark grey to black sandy loam with charcoal inclusions (L2); at ramped entrance, only;	27	Infill Layer 1, Infill Layer 3	Refuse Layer 2
Construction Layer 1	Light brown sand below basal layer (L8); construction trench along north and east sides of pit (L4); sterile	6	n/a	n/a

Plan and Profile Drawings

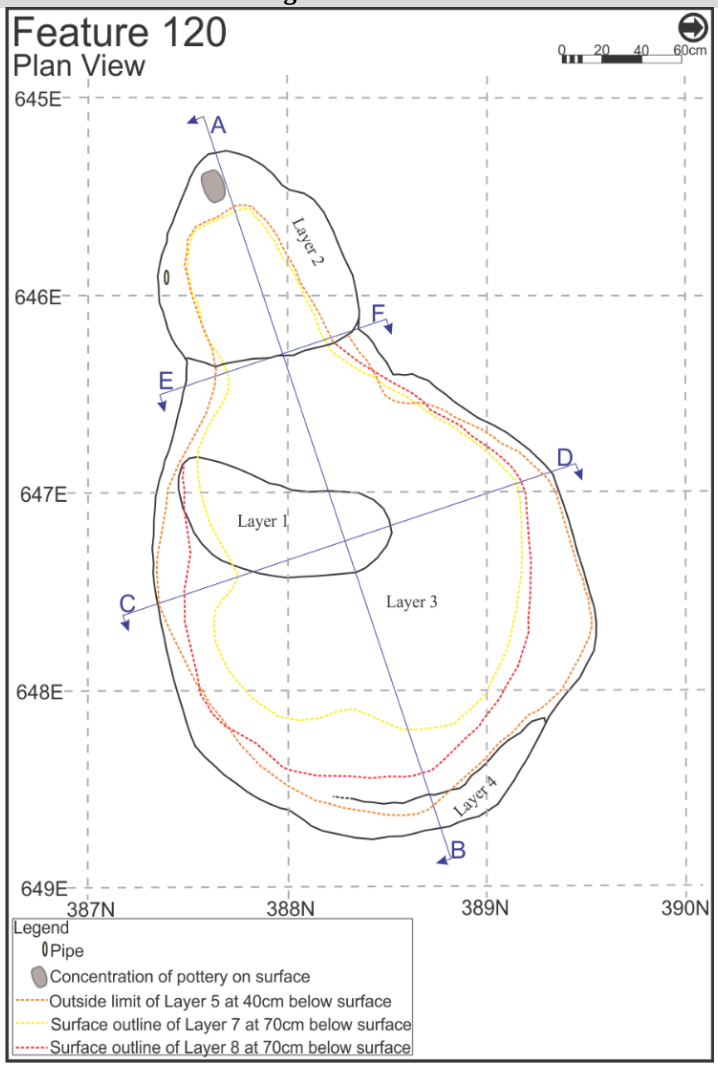


Figure 24 Feature 120 Plan View

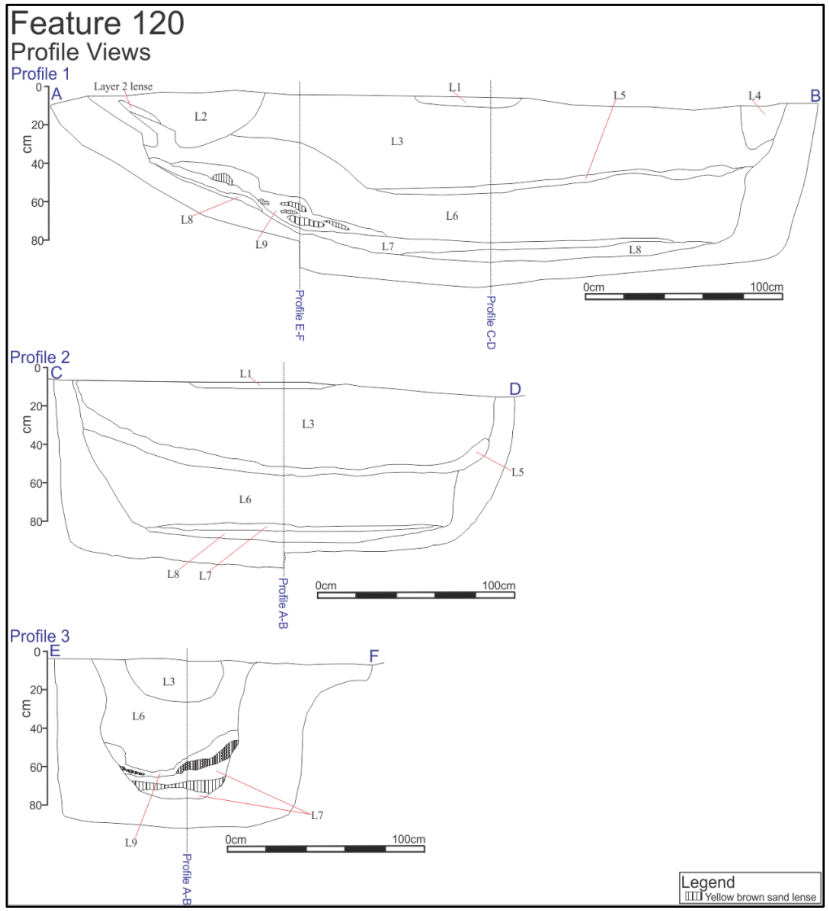


Figure 25 Feature 120 Profiles

Feature 134

Location	
Feature #	134
Location	West House
Comments	Appended to north wall (end cubicle); circular in plan view; below the basal layer was a hard, sterile red brown sand layer (L8) measuring 4 cm in depth. Bands of yellow to light brown sandy soil were located between the basal layer and the red sand in some portions of the pit (L7 and L9), and while sterile, are believed to be cultural in nature, deposited during construction prior to the use of the feature; artifacts of note include a bone bracelet and ceramic pipe mouth from Construction Layer 1, two bone awls and a ceramic pipe mouth from Infill Layer 2

Stratigraphy

Layer	Description	Thickness (cm)	Above	Below
Basal Layer	Dark grey to brown ashy sand with charcoal inclusions (L5)	9	Construction Layer 1	Infill Layer 1
Infill Layer 1	Light brown to yellow brown sandy loam with ash and charcoal inclusions (L4)	8	Basal Layer	Infill Layer 2
Infill Layer 2	Dark brown to black sandy loam with charcoal and ash inclusions (L3)	11	Infill Layer 1	Infill Layer 3, Infill Layer 4
Infill Layer 3	Light brown to yellow brown sandy loam subsoil with charcoal inclusions (L2)	50	Infill Layer 2	Refuse Layer 1
Refuse Layer 1	Very dark brown to black sandy loam with charcoal inclusions (L1)	10	Infill Layer 3	n/a
Construction Layer 1	Yellow to light brown sandy subsoil (L6), in ramped entrance	5	Subsoil	Basal Layer

Construction Layer 2	Yellow to light brown sandy subsoil (L7, L8, and L9), sterile	5-20	Subsoil	Basal Layer

Plan and Profile Drawings

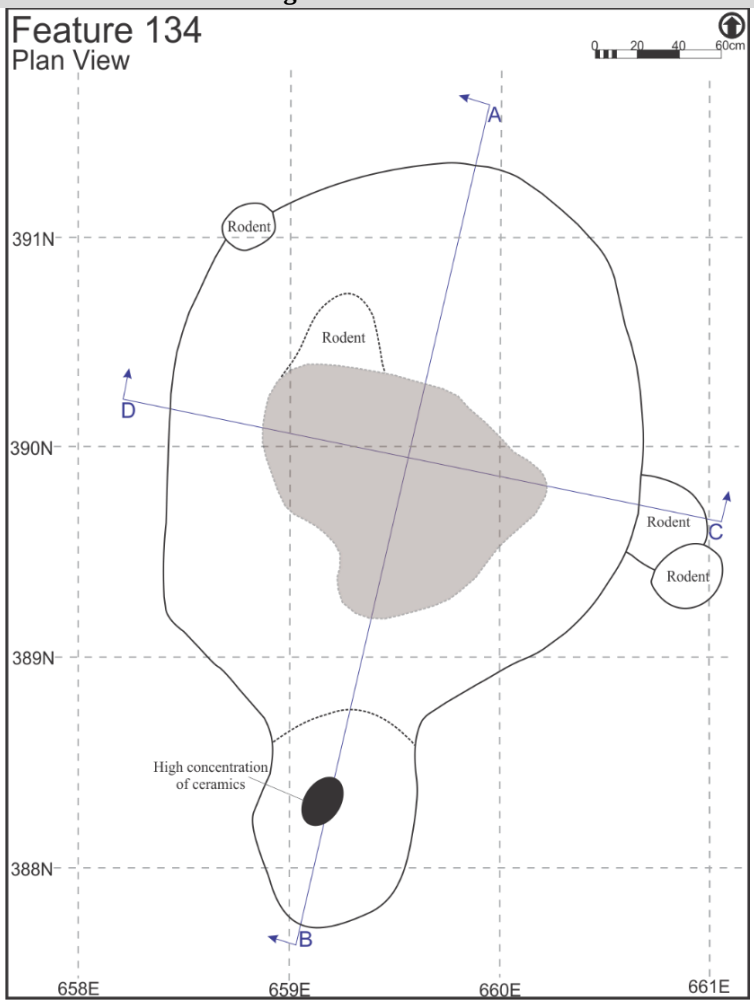


Figure 26 Feature 134 Plan View

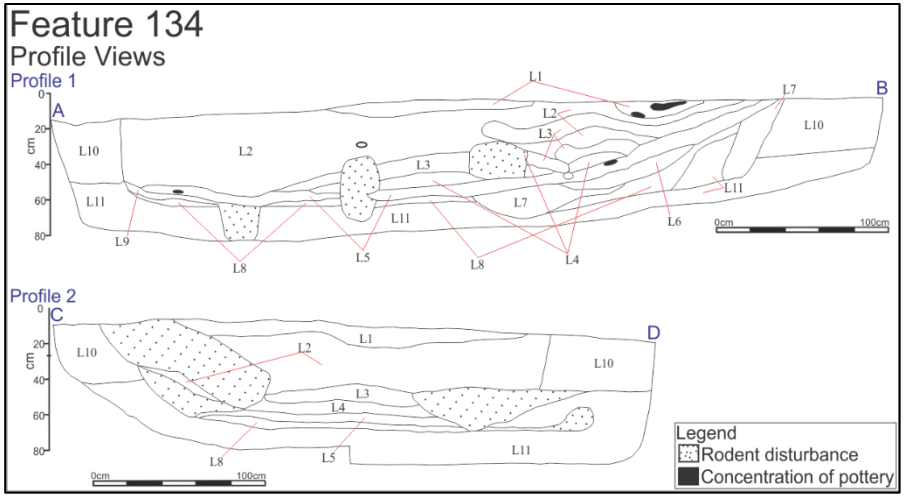
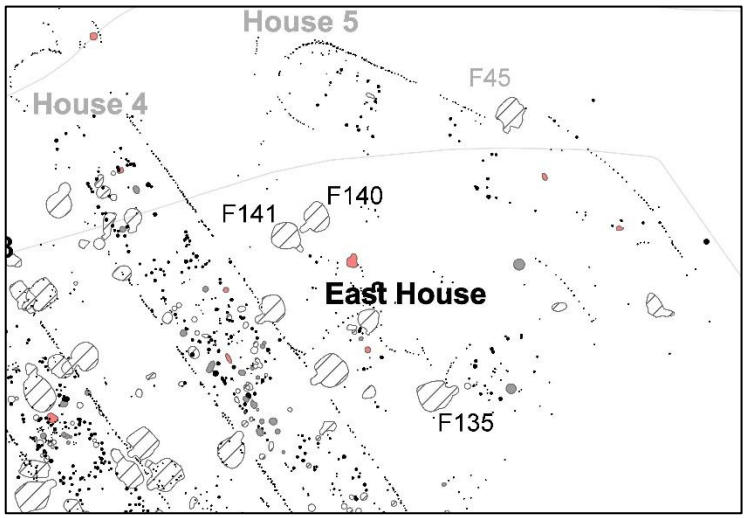


Figure 27 Feature 134 Profiles

Feature 135

Location	
Feature #	135
Location	East House
Comments	May be appended to possible circular structure in East House complex; in situ ring of stones was encountered at the surface of the basal layer and included fire cracked rocks and hardened ash deposits; artifacts of note include a bone pin recovered from the basal layer, a steatite pipe bowl fragment from the basal layer in the head of the pit (L6A), a gaming disc from Infill Layer 2, and a ceramic pipe bowl from Refuse Layer 2.



Stratigraphy

Layer	Description	Thickness (cm)	Above	Below
Basal Layer	Dark black and grey sandy loam with ash and charcoal inclusions (L6)	5	Construction Layer 1	Infill Layer 1
Infill Layer 1	Light brown to yellow brown sandy loam with ash and charcoal inclusions (L5)	40	Basal Layer	Infill Layer 2
Infill Layer 2	Grey brown sandy loam (L3 and L4)	20	Infill Layer 1	Infill Layer 3,
Infill Layer 3	Light brown to yellow brown sandy loam with charcoal inclusions (L2)	52	Infill Layer 2	Refuse Layer 1
Refuse Layer 1	Black loam with charcoal inclusions (L1), body of feature only	19	Infill Layer 3	n/a
Refuse Layer 2	Black loam with significant charcoal inclusions, and large quantities of fire cracked rock (L7)	20	Infill Layer 3	n/a
Construction Layer 1	Hard, sterile red brown sand layer (L8A)	8	Subsoil (L8)	Basal Layer

Plan and Profile Drawings

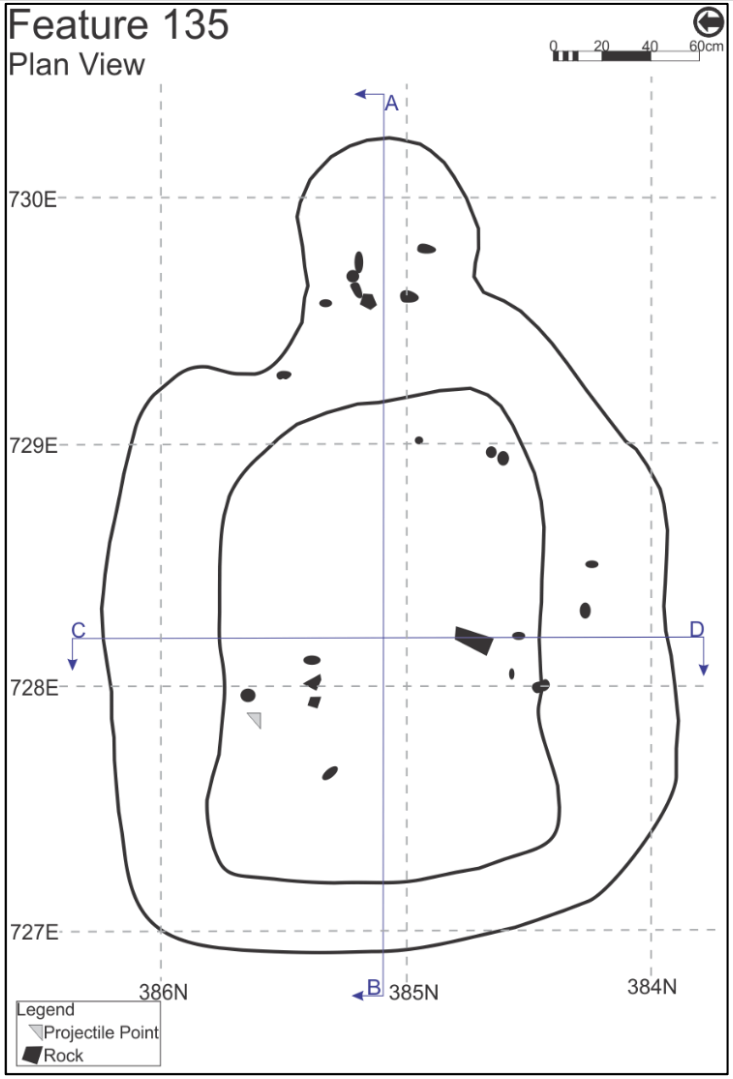


Figure 28 Feature 135 Plan View

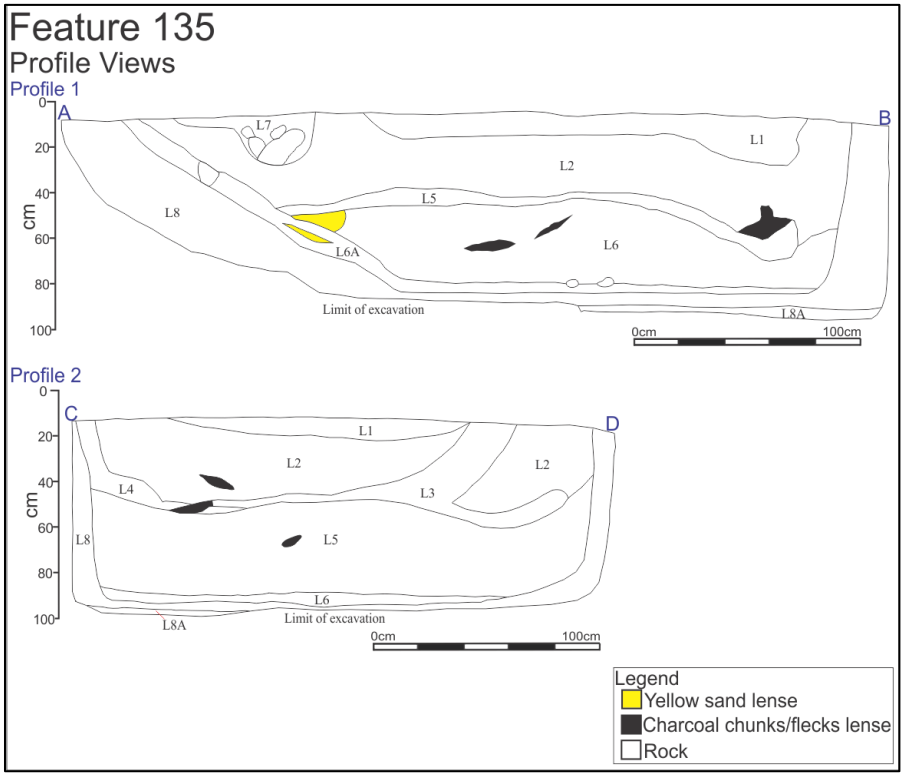
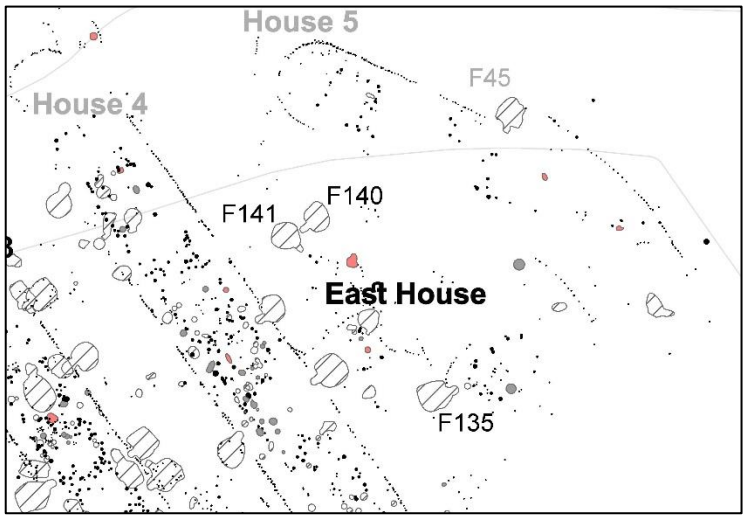


Figure 29 Feature 135 Profiles

Feature 140

Location	
Feature #	140
Location	East House
Comments	Located in north area of East House complex; exact alignment and location remain unknown due to poor settlement patterns in this portion of the site; artifacts of note include a ring collar ceramic pipe bowl (Basal Layer)



Stratigraphy

Layer	Description	Thickness (cm)	Above	Below
Basal Layer	Dark black and grey ashy sand with charcoal inclusions (L7)	8	Subsoil (L8)	Infill Layer 1
Infill Layer 1	Light brown to red brown sand (L6 and L9), in east half of feature only	38	Basal Layer	Infill Layer 2
Infill Layer 2	Dark grey sandy loam with charcoal and ash inclusions (L5)	8	Infill Layer 1	Infill Layer 3
Infill Layer 3	Light medium brown to yellow brown sandy loam with charcoal inclusions (L4)	23	Infill Layer 2	Refuse Layer 1
Infill Layer 4	Discontinuous grey brown sandy loam (L3)	15	Infill Layer 3	Refuse Layer 1
Infill Layer 5	Yellow brown sandy loam (L2)	16	Infill Layer 4 and 5	Refuse Layer 1
Refuse Layer 1	Dark brown to black sandy loam with charcoal inclusions (L1)	22	Infill Layer 3	n/a
Construction Layer	Sterile yellow sand (L10), separating Basal Layer (L7) from subsoil (L8)			

Plan and Profile Drawings

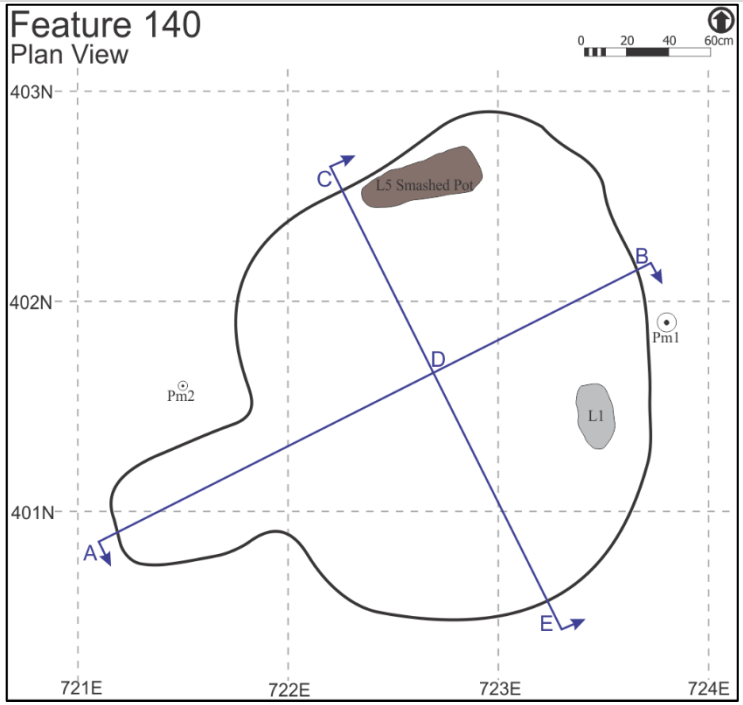


Figure 30 Feature 140 Plan View

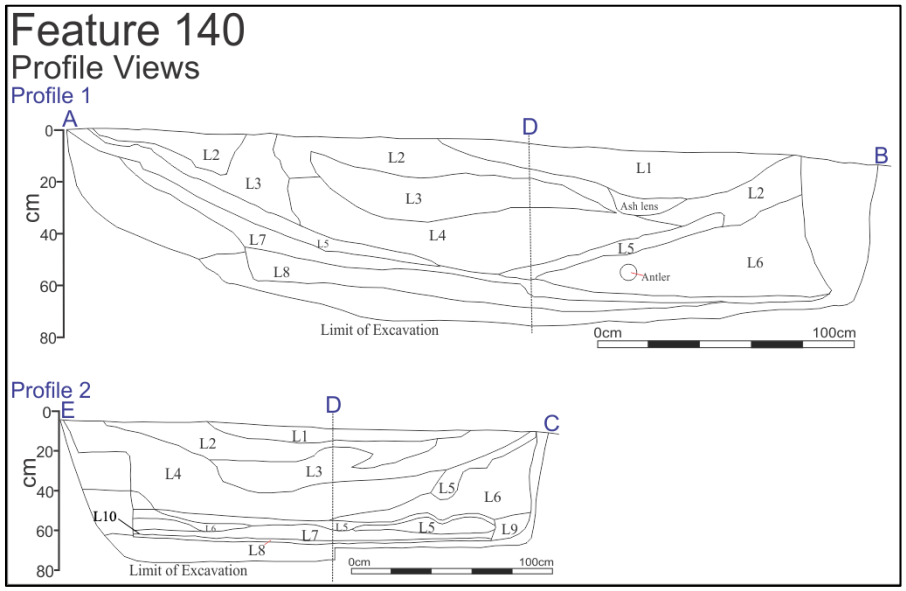
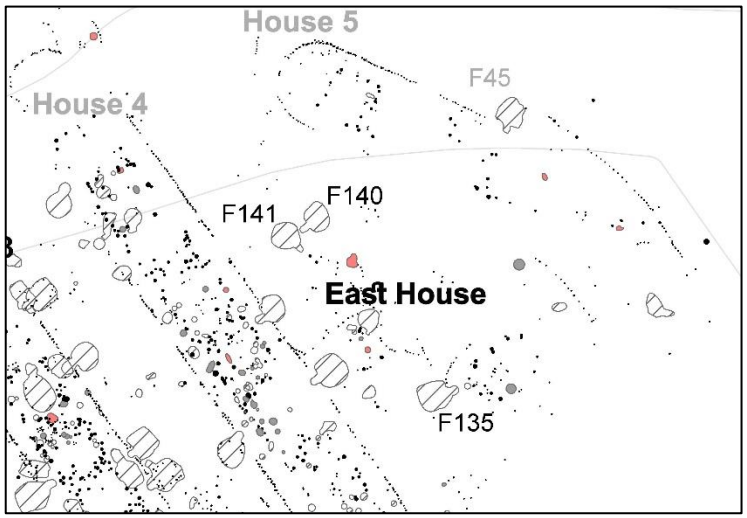


Figure 31 Feature 140 Profiles

Feature 141

Location	
Feature #	141
Location	East House
Comments	Located in north area of East House complex; exact alignment and location remain unknown due to poor settlement patterns in this portion of the site; while no artifacts of significance were recovered from this feature, one Glen Meyer Oblique rim fragment mended with a rim from F169, an SSL in House 4



Stratigraphy

Layer	Description	Thickness (cm)	Above	Below
Basal Layer	Medium grey sandy loam with significant ash and charcoal inclusions (L5), and was deeper in the ramped entrance (~16cm)	3	Construction Layer 1	Infill Layer 1
Infill Layer 1	Medium red brown sandy loam (L4)	22	Basal Layer	Infill Layer 2
Infill Layer 2	Light medium brown to yellow brown sandy loam with charcoal inclusions (L2)	13	Infill Layer 1	Infill Layer 3, Infill Layer 4
Refuse Layer 1	Dark grey to grey brown sandy loam with charcoal inclusions (L1)	20	Infill Layer 3	n/a
Rodent Disturbance	Light brown sandy loam (L3)	Variable	n/a	n/a
Construction Layer 1	Yellow sand (L6) sterile, with red sand below	3	Subsoil (L7 and L8)	Basal Layer

Plan and Profile Drawings

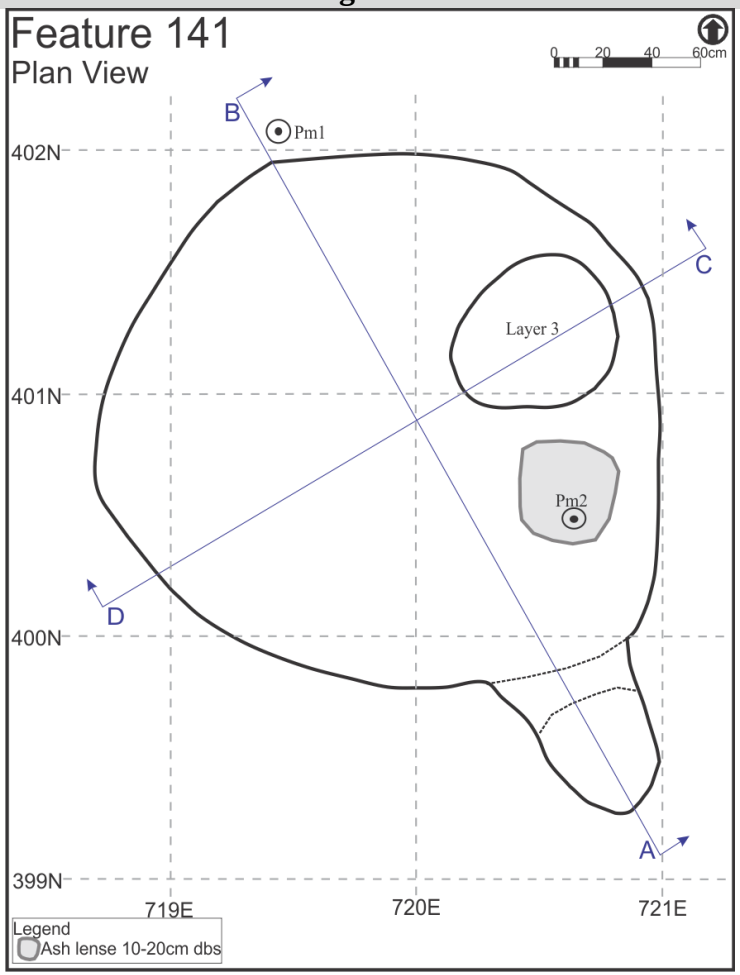


Figure 32 Feature 141 Plan View

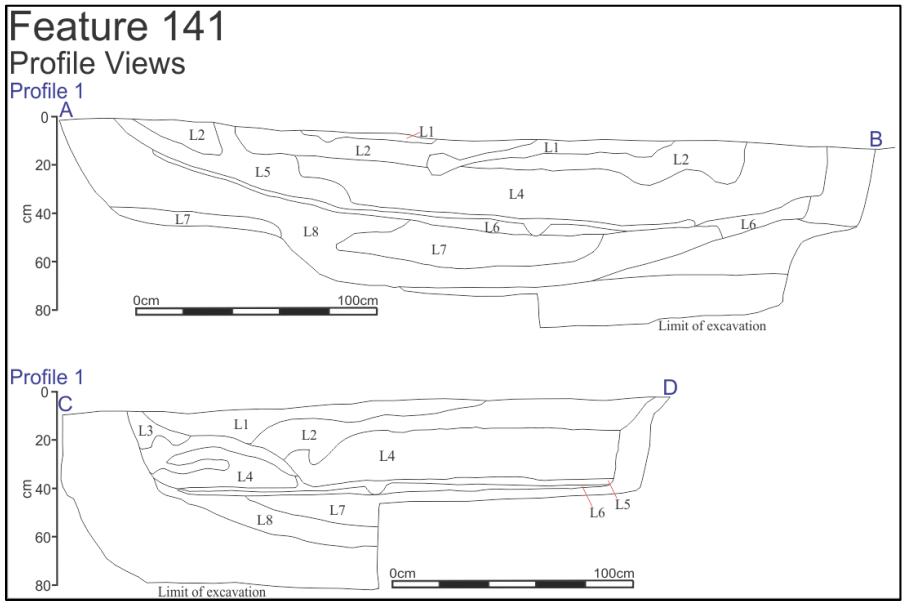
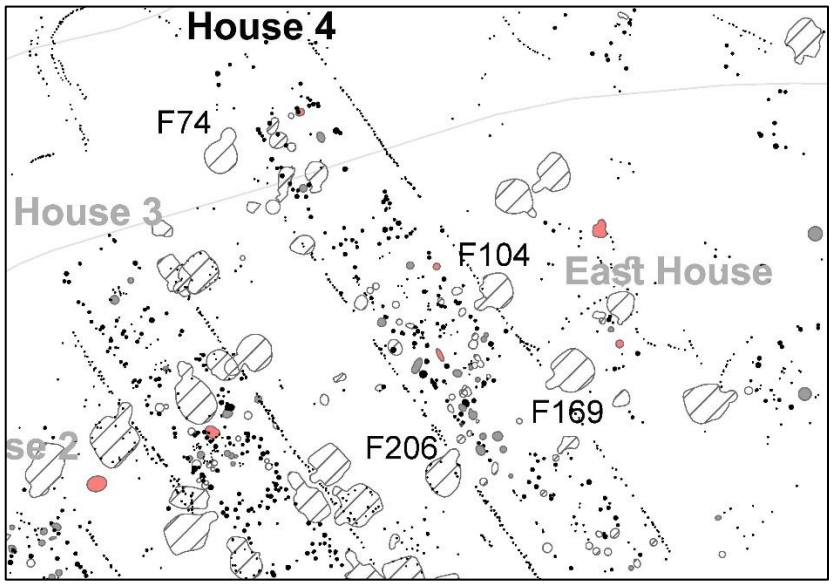


Figure 33 Feature 141 Profiles

Feature 169

Location	
Feature #	169
Location	House 4
Comments	Appended to east wall; rounded square in plan view; large clearing under bunk and centre line around ramped entrance; while no artifacts of significance were recovered from this feature, one Glen Meyer Oblique rim fragment mended with a rim from F141 in the East House area



Stratigraphy

Layer	Description	Thickness (cm)	Above	Below
Basal Layer	Grey to black sandy loam with ash deposits and charcoal deposits (L5). Significantly thicker in ramped entrance.	3 (body) 14 (ramp)	Subsoil (L6)	Infill Layer 1
Infill Layer 1	Medium to yellow brown sandy loam subsoil (L3)	35	Basal Layer	Infill Layer 2
Infill Layer 2	Dark brown sandy loam with charcoal deposits (L4); Lens located within Infill Layer 1; Artifact rich refuse layer within subsoil infill layer	8	Infill Layer 1	Infill Layer 1
Infill Layer 3	Yellow brown sandy loam subsoil with pockets of grey brown sandy loam with charcoal inclusions (L2)	17	Infill Layer 2	Refuse Layer 1
Refuse Layer 1	Dark brown and black sandy loam with charcoal inclusions (L1)	5	Infill Layer 3	n/a

Plan and Profile Drawings

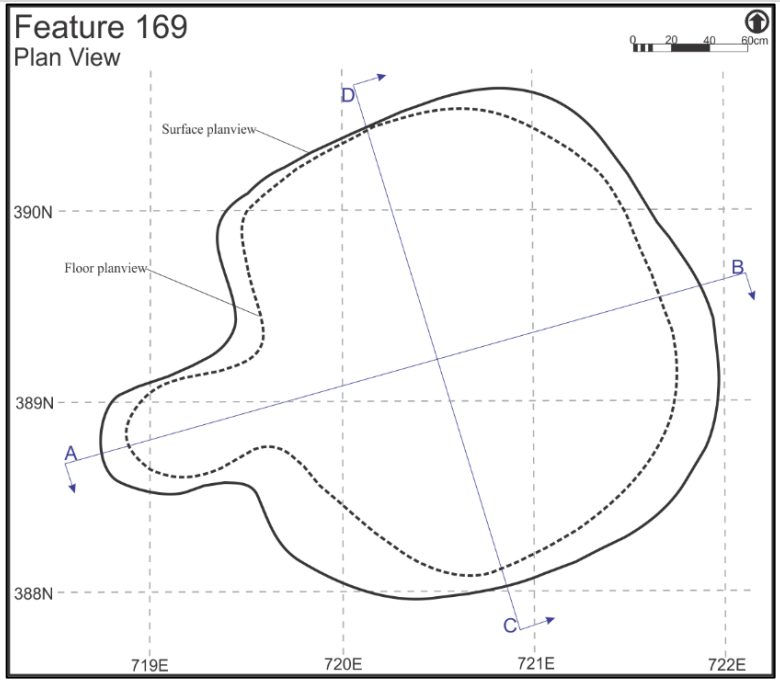


Figure 34 Feature 169 Plan View

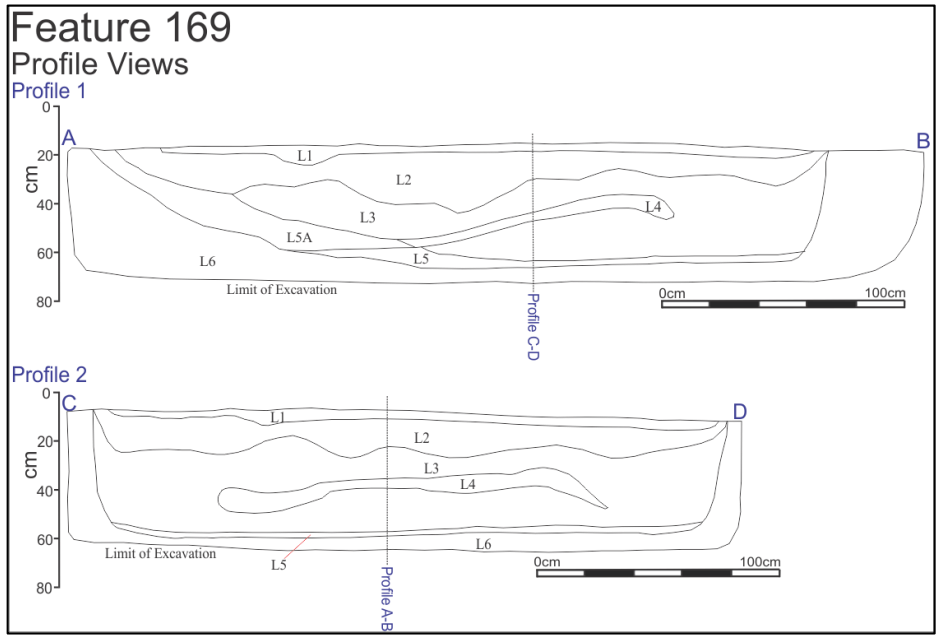
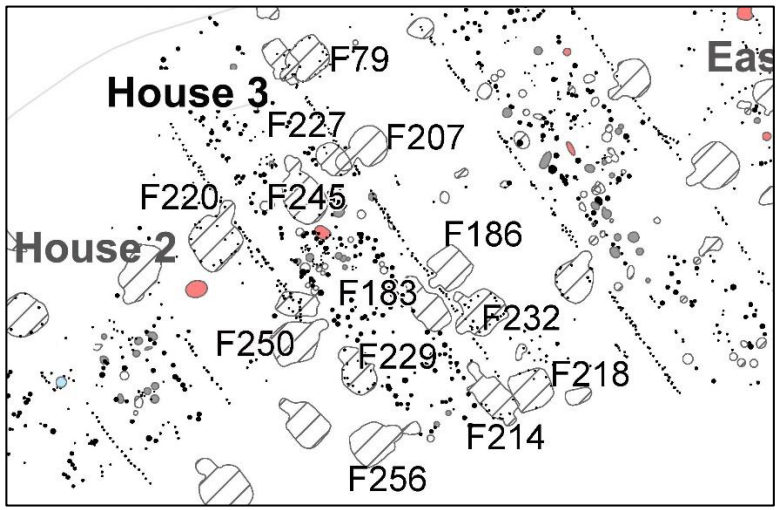


Figure 35 Feature 169 Profiles

Feature 183

Location	
Feature #	183
Location	House 3
Comments	Located in east bunk line; rounded rectangle in plan view; likely not in use at the same time as neighbouring SSLs (F186 and F232), given proximity and limited access via ramped entrances; artifacts of note include a complete antler awl (Infill Layer 4), two bone awls (Infill Layer 6 and Refuse Layer 1), a stone gaming disc (Refuse Layer 2), and a ceramic pipe bowl and mouth piece (Infill Layer 4)



Stratigraphy

Layer	Description	Thickness (cm)	Above	Below
Basal Layer	Dark brown and grey sandy loam with charcoal and ash inclusions (L15)	9	Subsoil (L16)	Infill Layer 1, Infill Layer 2
Infill Layer 1	Fire-reddened soil (L13) and black sandy loam with charcoal inclusions (L14); Remnants of a fire, unknown if primary or secondary deposition.	4	Basal Layer	Infill Layer2
Infill Layer 2	Light brown sandy loam with charcoal inclusions (L20)	10	Basal Layer, Infill Layer 1	Infill Layer 3, Infill Layer 4
Infill Layer 3	Grey brown fine sandy loam with charcoal inclusions (L12, L18), extends up ramp	12	Infill Layer 2	Infill Layer 4
Infill Layer 4	Medium yellow to light brown fine sandy loam with charcoal inclusion (L8, L9, L11, L17); Slight variations in colour and texture were noted and were assigned different layers	45	Infill Layer 3	Infill Layer 5, Infill Layer 6
Infill Layer 5	Deposit of ash (L7) and fire reddened soil (L5) in west half of feature	14	Infill Layer 4	Infill Layer 6, Refuse Layer 2
Infill Layer 6	Medium dark brown sandy loam with charcoal inclusions (L3, L4, and L6)	23	Infill Layer 4, Infill Layer 5	Refuse Layer 2

Refuse Layer 1	Dark brown and black sandy loam with charcoal inclusions (L2)	8	Infill Layer 6	Refuse Layer 1
Refuse Layer 2	Medium brown and grey sandy loam with ash deposits (L1)	10	Refuse Layer 2	n/a
Rodent Disturbance	Rodent burrows located within feature (L10, L19)	n/a	Various	Various

Plan and Profile Drawings

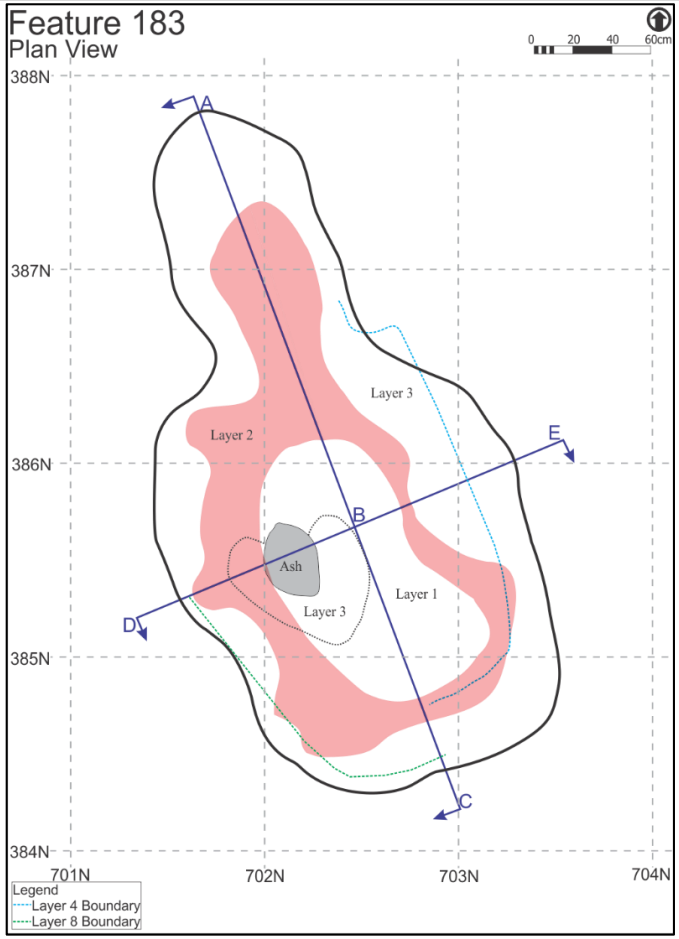


Figure 36 Feature 183 Plan View

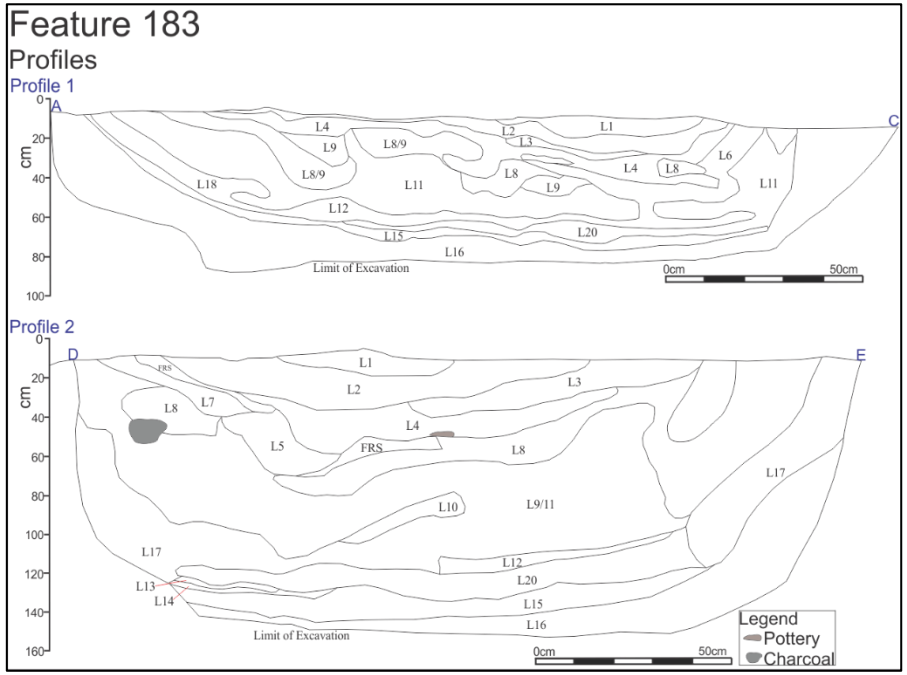
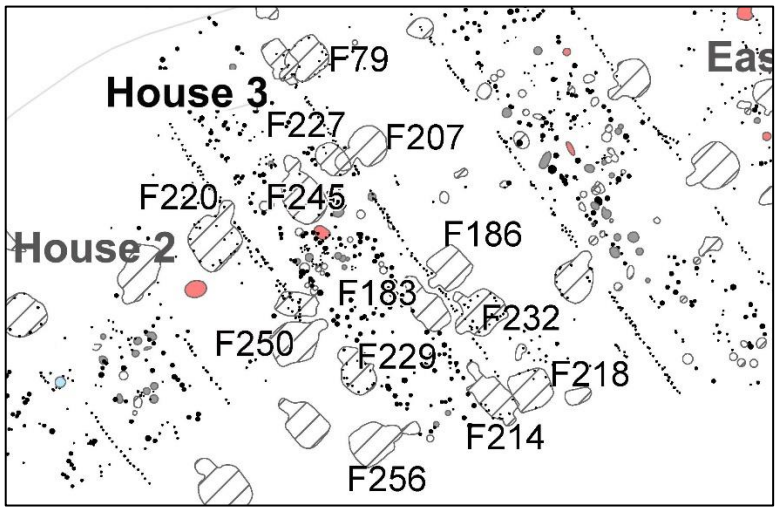


Figure 37 Feature 183 Profiles

Feature 186

Location	
Feature #	186
Location	House 3
Comments	Appended to east wall; rounded square in plan view; likely not in use at the same time as neighbouring SSLs (F183 and F232), given proximity and limited access via ramped entrances; artifacts of note include three bone awls (Infill Layer 2, near basal layer)



Stratigraphy

Layer	Description	Thickness (cm)	Above	Below
Basal Layer	Grey ash with charcoal inclusions; chunks of hard ash (L5); circular ash depression of same soil found in northwest quadrant	9	Subsoil	Infill Layer 1, Infill Layer 2
Infill Layer 1	Yellow brown sandy loam with charcoal inclusions (L4); sterile subsoil	4	Basal Layer	Infill Layer 3
Infill Layer 2	Black and dark grey sandy loam with charcoal inclusions (L3); Bisected in some areas by Infill Layer 1 (L4)	4	Basal Layer	Infill Layer 3
Infill Layer 3	Yellow brown sandy loam with charcoal inclusions (L2)	12	Infill Layer 1, Infill Layer 2	Refuse Layer 1
Refuse Layer 1	Medium brown sandy loam with charcoal inclusions (L1), located in body only	30	Infill Layer 3	n/a
Refuse Layer 2	Grey brown sandy loam with charcoal inclusions (L7), located in head only	38	Infill Layer 3	n/a
Construction Layer 1	Light yellow brown sand with sections of rodent disturbance (L6); sterile, except for area of rodent disturbance	2	n/a	Basal Layer

Plan and Profile Drawings

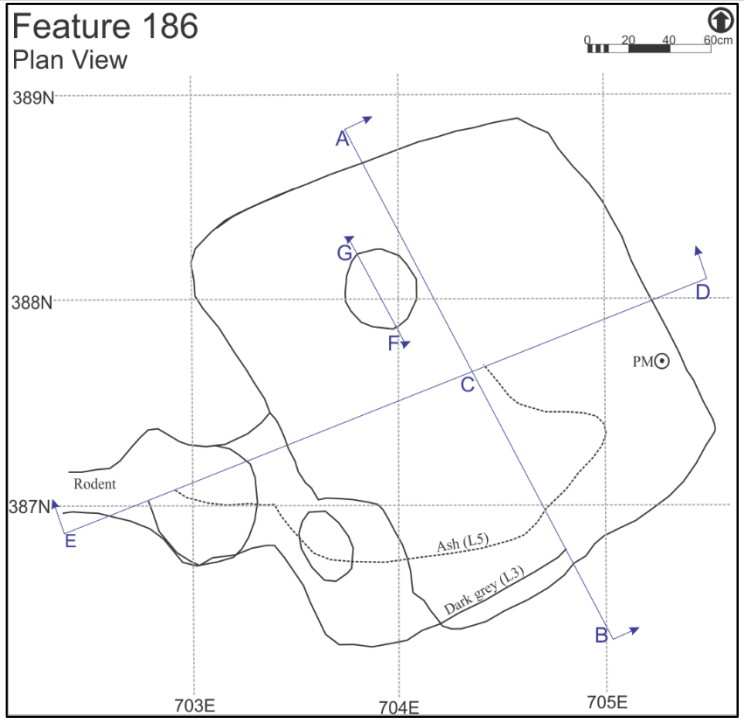


Figure 38 Feature 186 Plan View

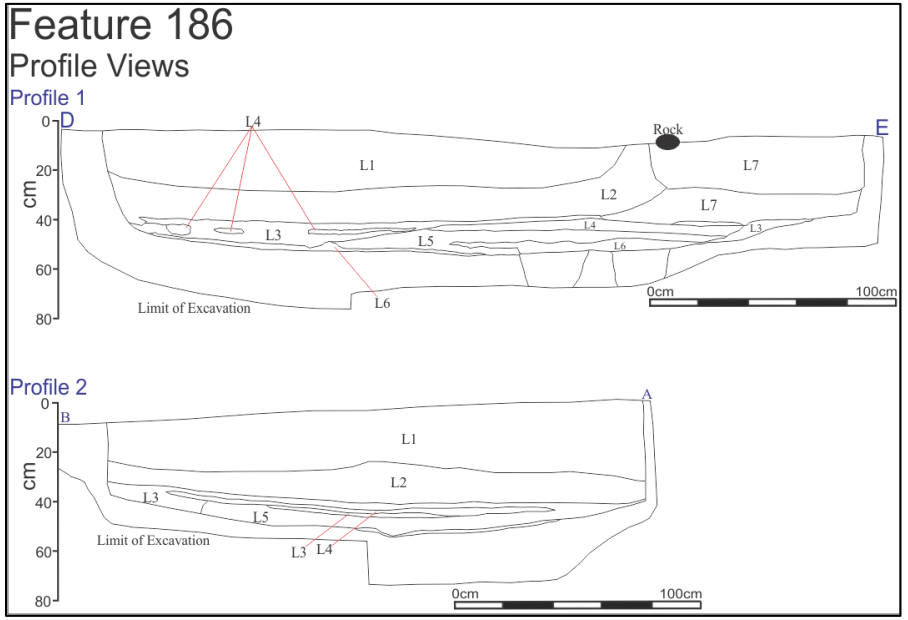
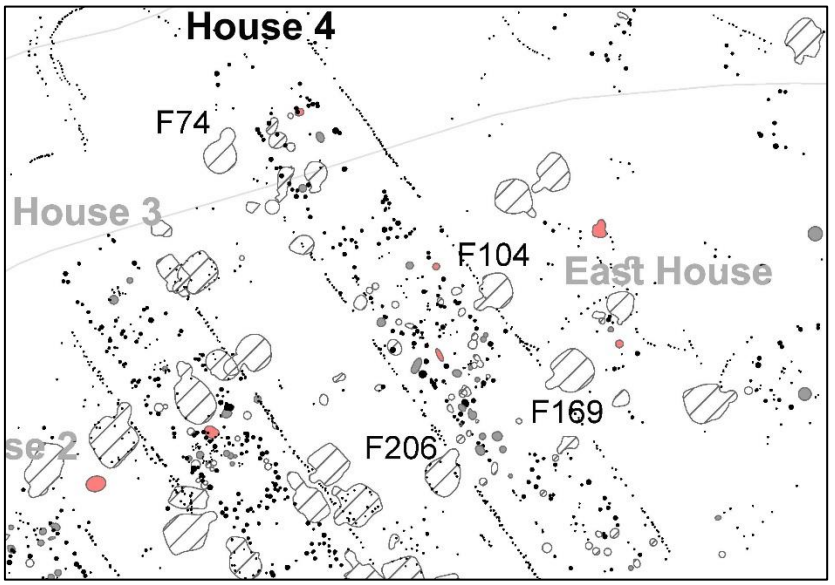


Figure 39 Feature 186 Profiles

Feature 206

Location	
Feature #	206
Location	House 4
Comments	Appended to west wall; circular in plan view; artifacts of note include a ceramic pipe stem (Basal Layer) and a bone awl (Refuse Layer 1)



Stratigraphy

Layer	Description	Thickness (cm)	Above	Below
Basal Layer	Dark black and grey sandy loam with charcoal inclusions (L6)	4	Construction Layer 1	Infill Layer 1
Infill Layer 1	Black and dark grey sandy loam with charcoal inclusions (L5)	14	Basal Layer	Infill Layer 2
Infill Layer 2	Light medium brown to yellow brown sandy loam with charcoal inclusions (L4)	24	Infill Layer 1	Infill Layer 3, Infill Layer 4
Infill Layer 3	Light medium brown to yellow brown sandy loam with charcoal inclusions (L2, L3)	50	Infill Layer 2	Refuse Layer 1
Infill Layer 4	Red brown sandy loam with charcoal inclusions (L8), in ramped entrance only	51	Infill Layer 3	Refuse Layer 1
Refuse Layer 1	Dark brown to black sandy loam with charcoal inclusions (L1)	20	Infill Layer 3	n/a
Construction Layer 1	Light yellow brown sand, hard packed base of feature (L7)	3	n/a	Basal Layer

Plan and Profile Drawings

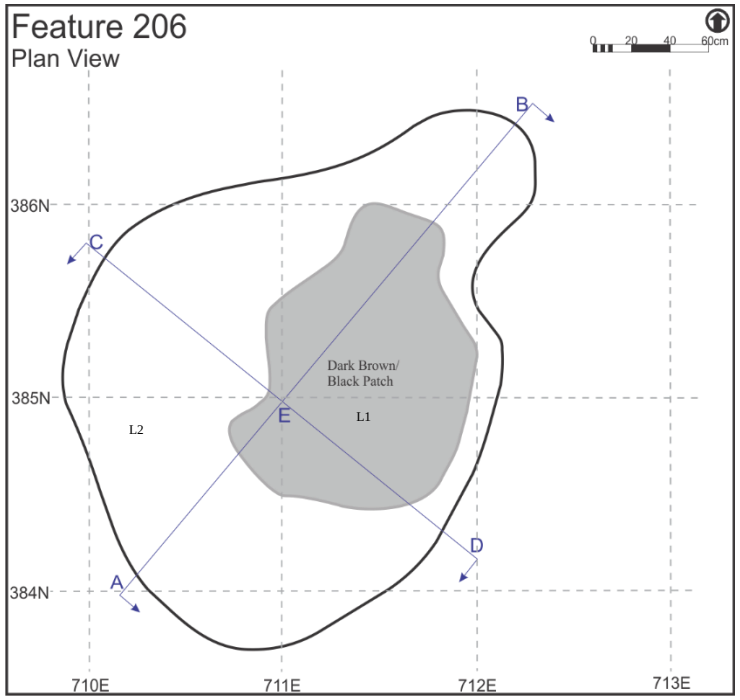


Figure 40 Feature 206 Plan View

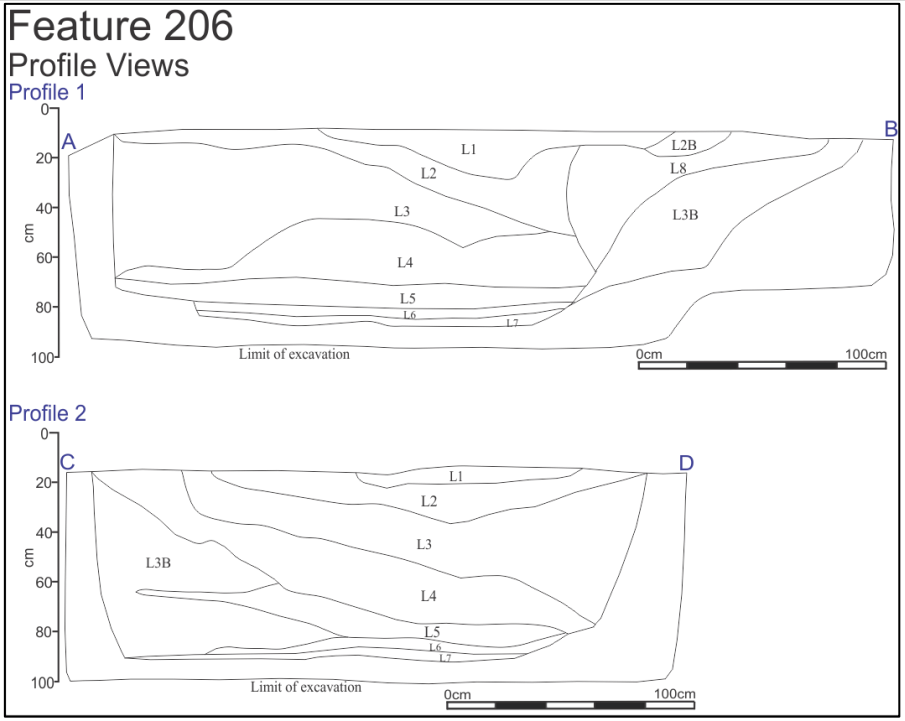
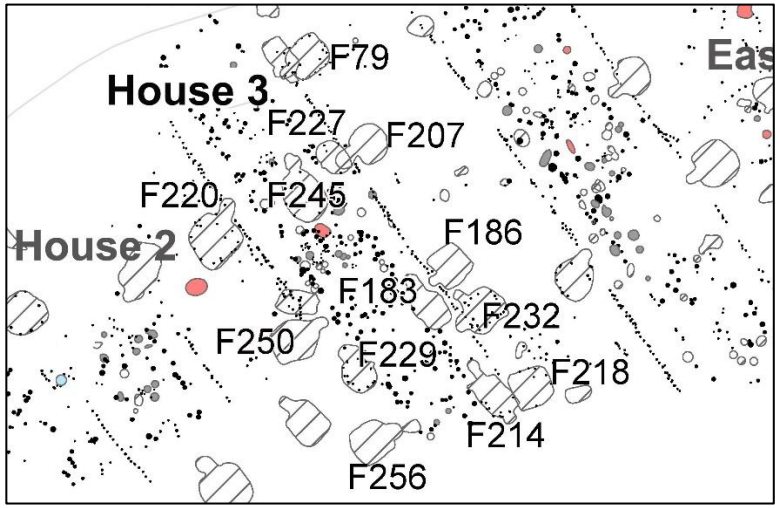


Figure 41 Feature 206 Profiles

Feature 207

Location	
Feature #	207
Location	House 3
Comments	Appended to east wall; circular in plan view; cuts into F227, another SSL located in the east bunk line of House 3; an intact turtle shell was found at the bottom of the ramped entrance way where F207 cuts into F227; also recovered from the ramped entrance were three bone awls and one ceramic pipe elbow (Infill Layer 3 and Refuse Layer 1).



Stratigraphy

Layer	Description	Thickness (cm)	Above	Below
Basal Layer	Dark brown and grey silt loam with charcoal and ash inclusions (L7, L10), with pockets of light (L9) and dark (L8) brown silt loam	7	Construction Layer 1	Infill Layer 1
Infill Layer 1	Medium to light brown silt loam with charcoal and ash inclusions (L5, L6)	18	Basal Layer	Infill Layer 2
Infill Layer 2	Light brown sandy loam with charcoal inclusions (L4)	49	Infill Layer 1	Infill Layer 3
Infill Layer 3	Medium brown sandy loam with charcoal inclusions (L3)	24	Infill Layer 2	Infill Layer 4
Infill Layer 4	Light brown sandy loam with charcoal inclusions (L2)	17	Infill Layer 3	Refuse Layer 1
Refuse Layer 1	Medium dark brown to black sandy loam with charcoal inclusions (L1), in body only	14	Infill Layer 2	n/a
Refuse Layer 2	Medium dark brown silt loam with charcoal and ash inclusions (L13), in ramped entrance only	14	Infill Layer 3	n/a

Construction Layer 1	Red brown sand (L11) layer immediately below basal layer	1	Subsoil	Basal Layer
Construction Layer 2	Yellow brown sand with charcoal inclusions (L14) located adjacent to ramped entrance at bottom of pit	6	Subsoil	Infill Layer 1

Plan and Profile Drawings

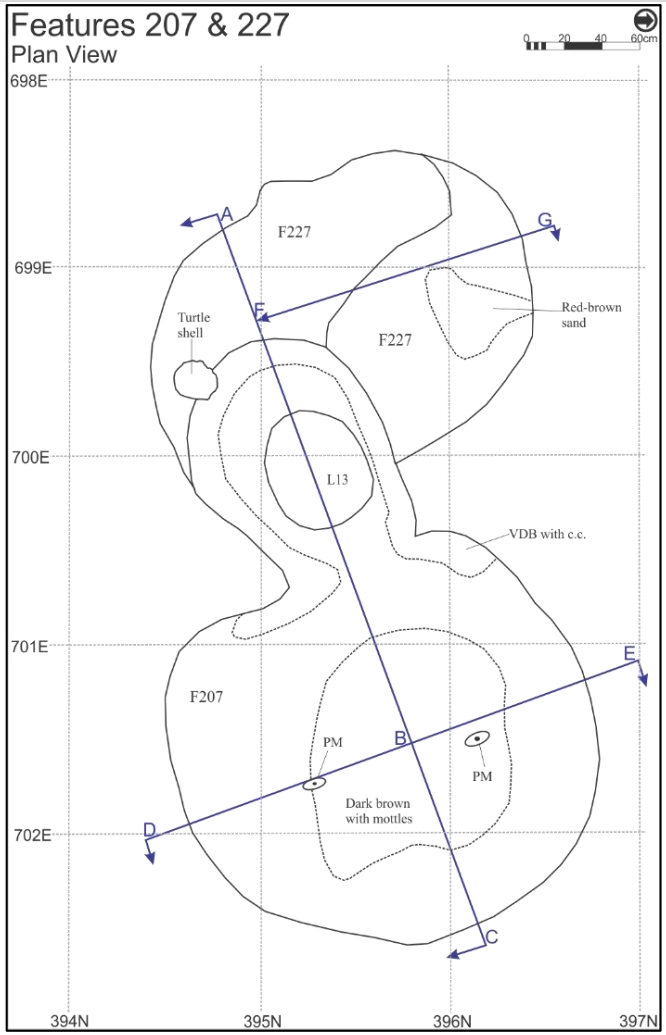


Figure 42 Feature 207 Plan View

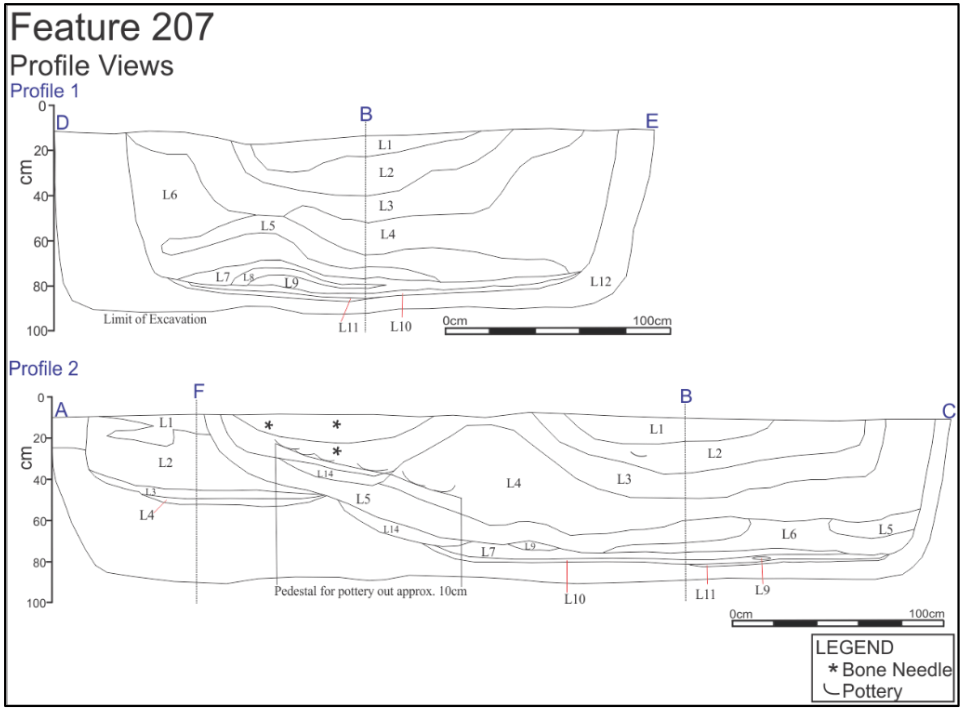
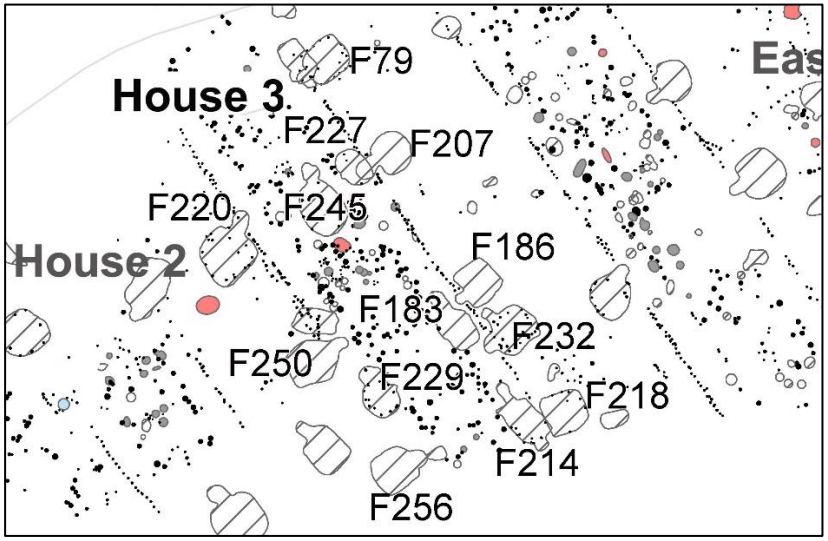


Figure 43 Feature 207 Profiles

Feature 214

Location	
Feature #	214
Location	House 3
Comments	Located in east bunk line; rounded rectangle; double ramped entrance way; cuts into F218; significant disturbance from rodent activity/tree roots along east edge; appears that F214 replaced F218; north entrance built after south; artifacts of note include two pipe bowls (Refuse Layer 1), two pipe mouth pieces and one stem and two bone awls and a deer tibia head with a bore hole (Infill Layer 5), a toggle and bone awl (Basal Layer 1), one antler awl (Basal Layer 3)



Stratigraphy

Layer	Description	Thickness (cm)	Above	Below
Basal Layer 1	Medium grey sandy ash with charcoal inclusions (L11)	3	Construction Layer 1	Infill Layer 1
Infill Layer 1	Medium yellow brown to grey brown sandy loam with charcoal inclusions (L9, L10)	10	Basal Layer1	Basal Layer 2
Basal Layer 2	Dark grey sandy loam with ash and charcoal inclusions (L8B)	1	Infill Layer 1	Infill Layer 2
Infill Layer 2	Medium yellow brown sand with charcoal inclusions (L8A)	6	Basal Layer 2	Basal Layer 3
Basal Layer 3	Dark grey sandy loam with ash and charcoal inclusions (L7, L3); thicker deposit along south ramped entrance (10 cm deposit)	2	Infill Layer 2	Infill Layer 3, Infill Layer 6
Infill Layer 3	Light yellow brown to grey brown sandy loam with ash and charcoal (L2, L6)	24	Basal Layer 3	Infill Layer 6
Infill Layer 4	Medium grey (L5) and light grey (L4) sandy loam with ash deposits located only in north ramped entrance	20	Construction Layer 1	n/a

Infill Layer 5	Primary infilling event; Medium to yellow brown sandy loam with charcoal inclusions (L1B)	54	Infill Layer 3 Basal Layer 3	n/a
Refuse Layer 1	Dark brown to black silt loam with charcoal and ash inclusions (L1A)	10	Infill Layer 5	n/a
Construction Layer 1	Medium yellow brown sand (L12)	3	Subsoil	Basal Layer 1
Rodent Disturbance	Medium grey brown sandy loam with charcoal inclusions (L3B); located in the southeast quadrant of feature; also impacts F218	32	Subsoil	Basal Layer 3

Plan and Profile Drawings

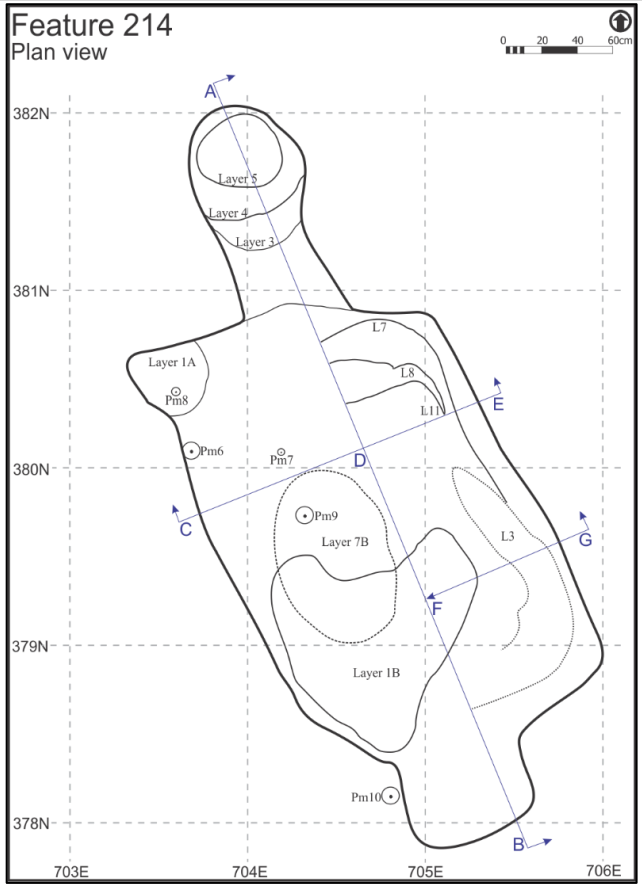


Figure 44 Feature 214 Plan View

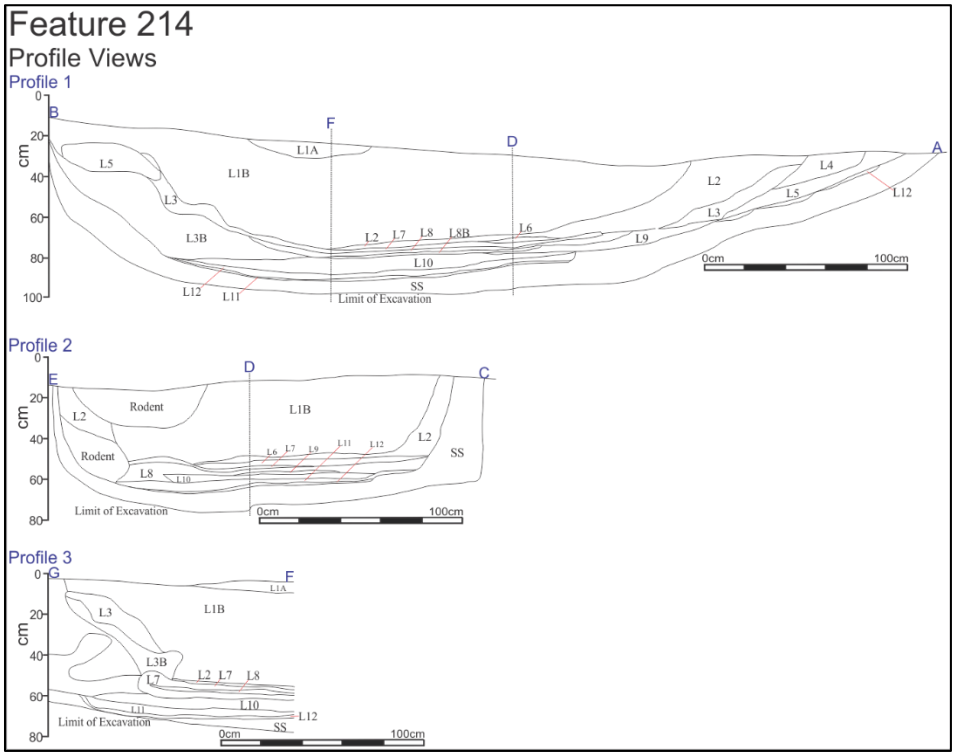
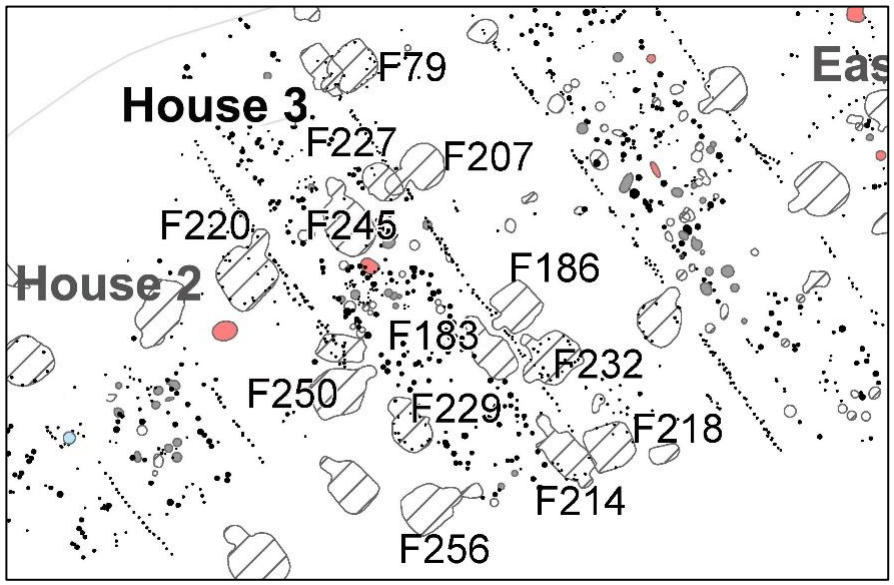


Figure 45 Feature 214 Profiles

Feature 218

Location	
218	3
Location	House 3
Comments	Appended to east wall; rounded square; cut into by F214; significant disturbance from rodent activity and tree roots in the west half; construction of F214 destroyed ramped entrance; report documents this feature as a storage pit, however all field notes indicate is was classified as an SSL; artifacts of note include a plain conical pipe bowl (Basal Layer 1), one fragmentary pipe bowl and two pipe stems (Infill Layer 3, ramped entrance), one pipe mouth piece (Refuse Layer 1), a copper bead (Refuse Layer 1) and a bone awl (Basal Layer 1)



Stratigraphy

Layer	Description	Thickness (cm)	Above	Below
Basal Layer	Light to dark grey sand with ash and charcoal inclusions (L8) and concentration of fire-cracked rock (L8B)	12	Construction Layer 1	Infill Layer 1
Infill Layer 1	Medium yellow brown sandy loam with charcoal inclusions (L5) with red brown sand (L5A)	46	Basal Layer	Infill Layer 2
Infill Layer 2	Medium grey brown sand with ash (L6); commonly found in ramped entrance, and so likely related to now destroyed ramp	20	Basal Layer	Infill Layer 1
Infill Layer 3	Medium to dark brown sandy loam with charcoal and ash inclusions (L4)	10	Infill Layer 1	Infill Layer 4
Infill Layer 4	Yellow brown sandy loam with charcoal and ash inclusions (L3)	19	Infill Layer 3	Refuse Layer 1
Refuse Layer 1	Dark brown to black sandy loam with charcoal and ash inclusions (L1, L2)	10	Infill Layer 4	n/a

Construction Layer 1	Red brown sand (L9)	1	Subsoil	Basal Layer 1
Rodent Disturbance	Medium brown sandy loam with modern debris (L7)	10	Subsoil	Infill Layer 1

Plan and Profile Drawings

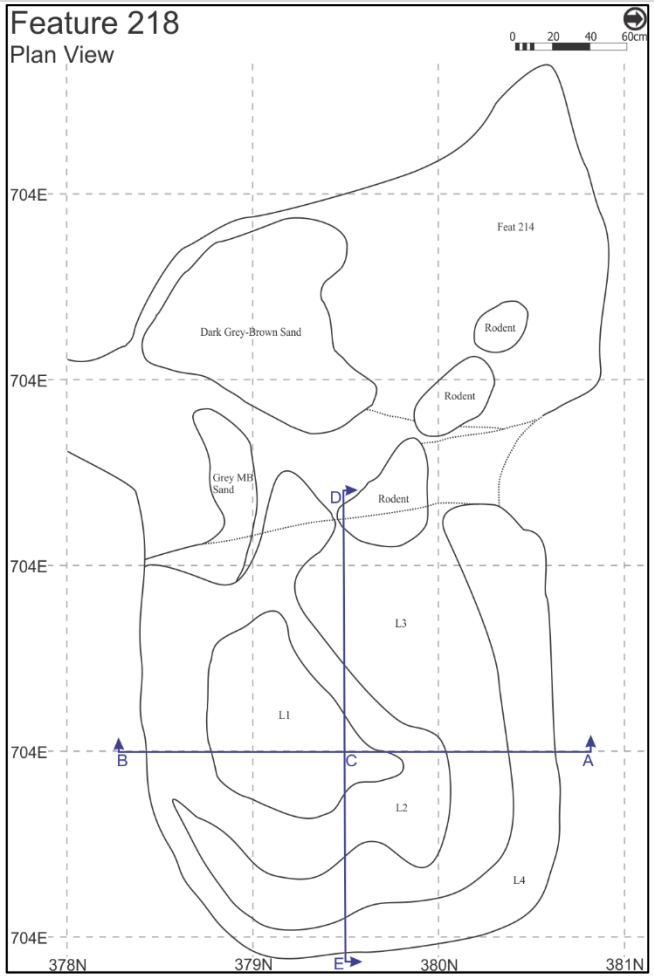


Figure 46 Feature 218 Plan View

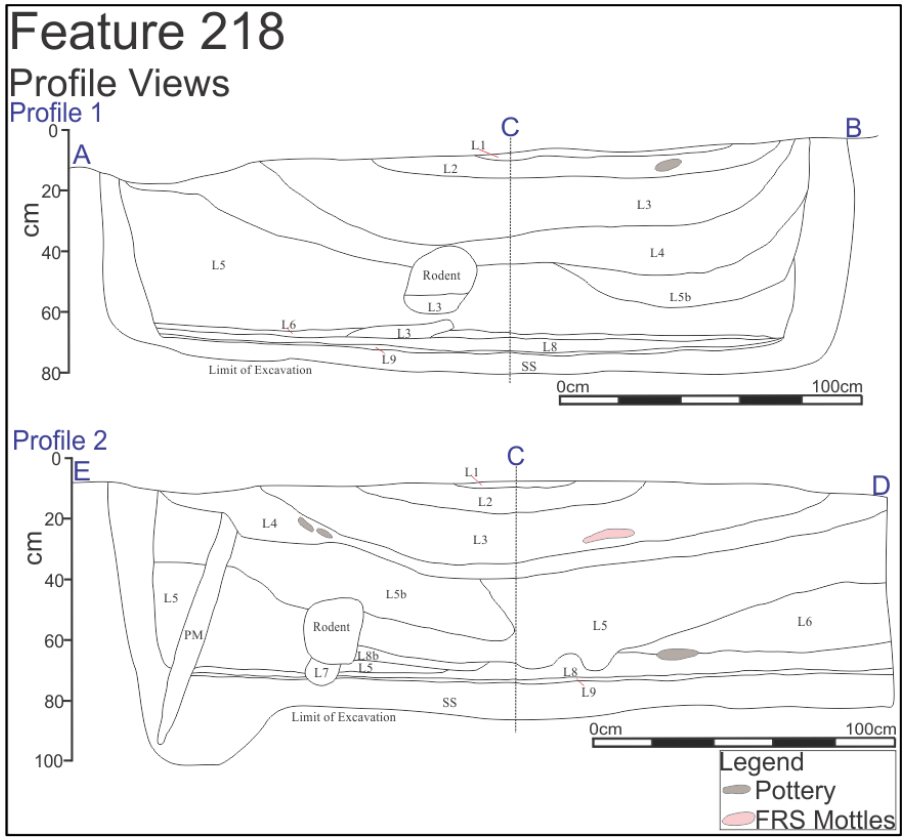
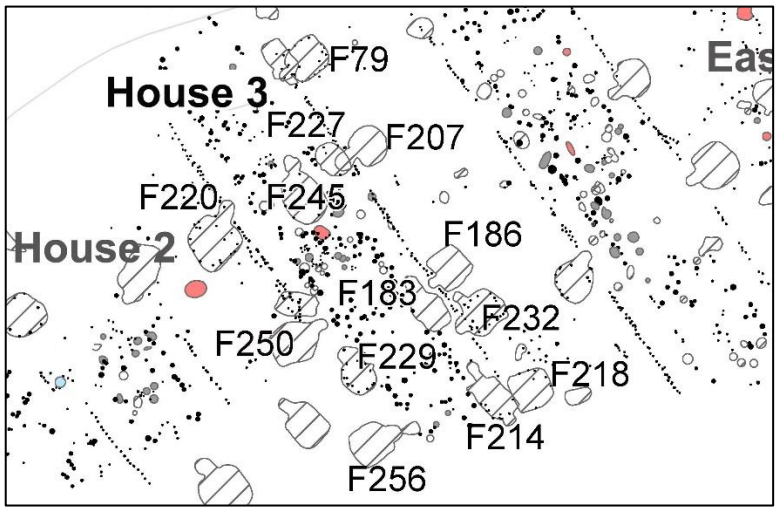


Figure 47 Feature 218 Profiles

Feature 220

Location	
Feature #	220
Location	House 3
Comments	Appended to west wall; rounded square in plan view; artifacts of note include a ceramic pipe stem without a bore hole recovered from the ramped entrance in Infill Layer 2



Stratigraphy

Layer	Description	Thickness (cm)	Above	Below
Basal Layer	Dark brown to black sandy loam with significant ash and charcoal inclusions (L9)	5	Subsoil (L15)	Infill Layer 1
Infill Layer 1	Grey to medium brown clay loam with ash and charcoal inclusions (L8)	9	Basal Layer	Infill Layer 4
Infill Layer 2	Medium to dark brown sandy loam with charcoal inclusions (L12, L13 and L14), located mostly in and near the ramped entrance	19	Basal Layer	Infill Layer 3
Infill Layer 3	Grey brown sandy loam with ash and charcoal inclusions (L11), located mostly in and near the ramped entrance	15	Infill Layer 2	Infill Layer 4
Infill Layer 4	Light brown sandy loam with few inclusions (L7) intermixed with lenses of dark brown sandy loam (L4, L5, and L6)	56	Infill Layer 1 Infill Layer 3	Infill Layer 6
Infill Layer 5	Dark brown to black sandy loam with charcoal inclusions (L10), located in ramped entrance only	8	Infill Layer 2	Infill Layer 6
Infill Layer 6	Dark brown sandy loam with charcoal inclusions (L3)	24	Infill Layer 4 Infill Layer 5	Refuse Layer 1
Infill Layer 7	Medium yellow brown sandy loam with charcoal inclusions (L2), sterile	6	Infill Layer 6	Refuse Layer 2

Refuse Layer 1	Dark brown to black sandy loam with charcoal and ash inclusions (L1)	10	Refuse Layer 1	n/a

Plan and Profile Drawings

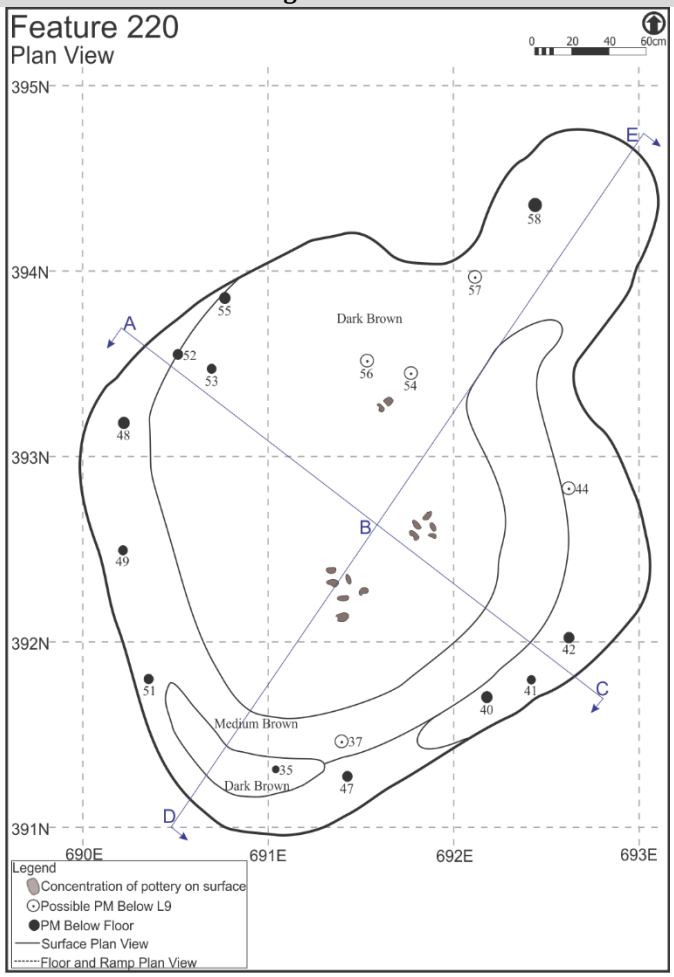


Figure 48 Feature 220 Plan View

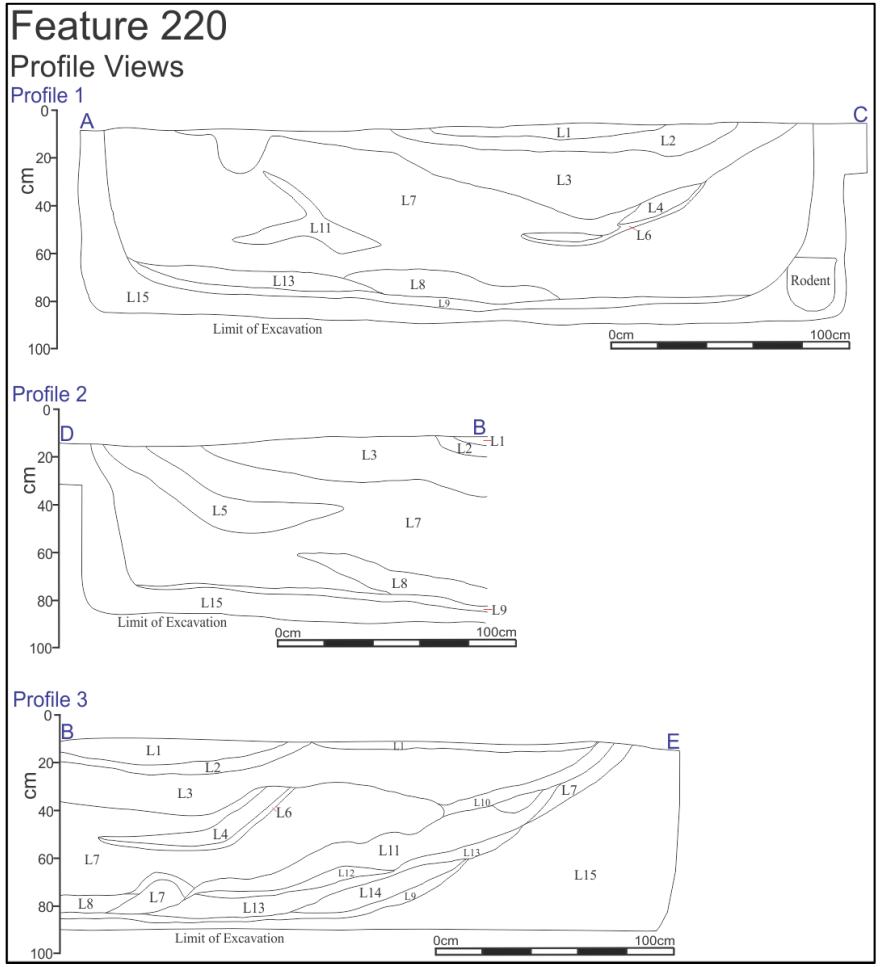
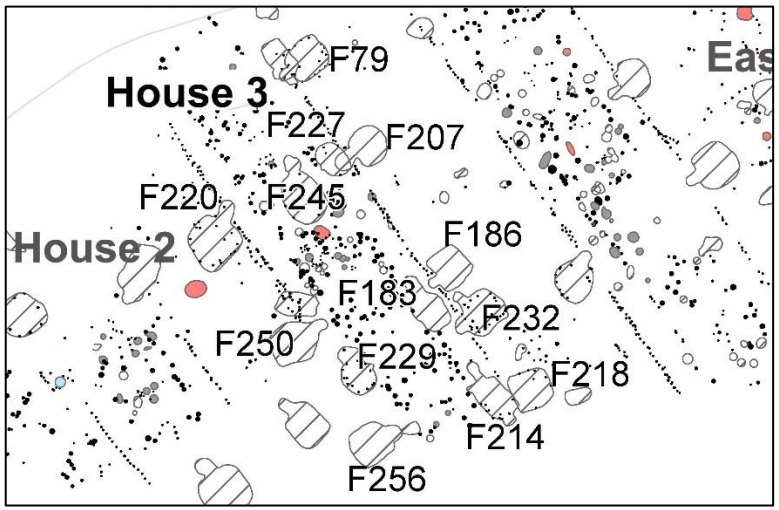


Figure 49 Feature 220 Profiles

Feature 227

Location	
Feature #	227
Location	House 3
Comments	Located in east bunk line; rounded square; excavators originally unsure whether this was a storage pit or an SSL; re-interpreted as SSL that is missing ramped entrance; suspected ramped entrance disturbed by rodent burrow at south end; F227 cut into by F207; contains intact turtle shell at top of basal layer, immediately below ramped entrance of F207; artifacts of note include one bone toggle recovered from the basal layer, and one bone awl recovered from Infill Layer 1.



Stratigraphy

Layer	Description	Thickness (cm)	Above	Below
Basal Layer	Dark brown and grey sandy loam with charcoal and ash inclusions (L3)	4	Construction Layer 1	Infill Layer 1
Infill Layer 1	Medium to light brown sandy loam with charcoal inclusions (L6)	38	Basal Layer	Infill Layer 2
Infill Layer 2	Dark brown and grey sandy loam lens with charcoal and ash inclusions (L7)	2	Infill Layer 1	Refuse Layer 1
Refuse Layer 1	Dark brown to black silt loam with charcoal and ash inclusions (L1)	14	Infill Layer 1	n/a
Construction Layer 1	Red brown sand (L4) layer immediately below basal layer	3	Subsoil (L5)	Basal Layer

Plan and Profile Drawings

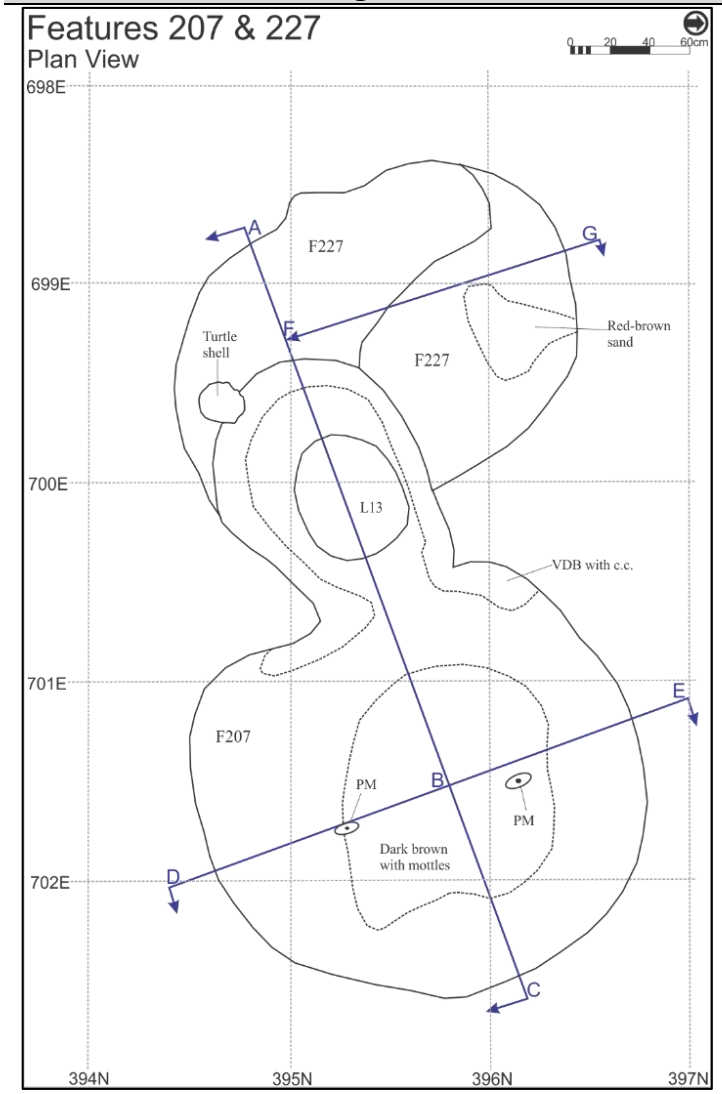


Figure 50 Feature 227 Plan View

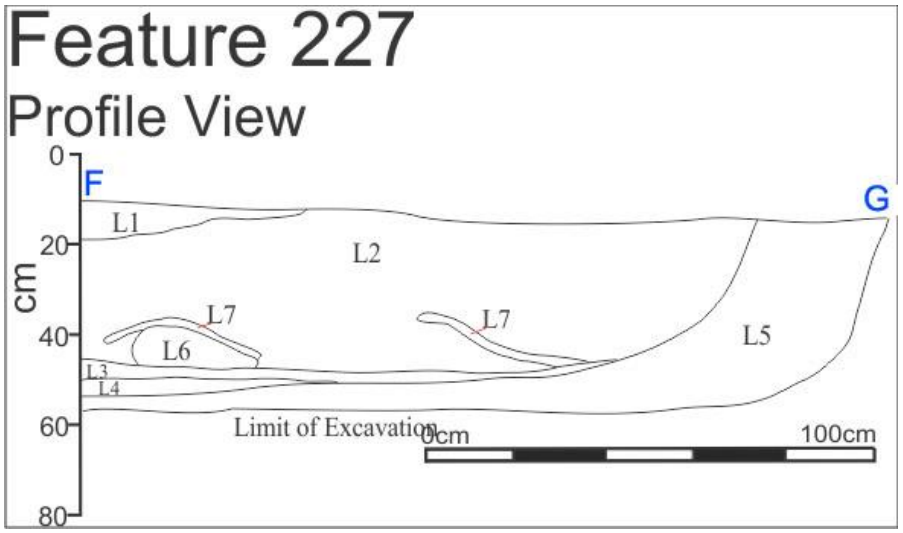


Figure 51 Feature 227 Profile

Feature 228

Location	
Feature #	228
Location	West House
Comments	Located in east bunk line; circular; relatively shallow SSL containing only a single infill layer; some surficial refuse lenses were identified, though their depths were insignificant (1cm or less) and their boundaries were diffuse; fired reddened soil and charcoal deposits evident on surface; artifacts of note include one ceramic pipe stem from Infill Layer 1; given the absence of a bore hole, is suspected to be of juvenile manufacture

Stratigraphy

Layer	Description	Thickness (cm)	Above	Below
Basal Layer	Dark black sandy loam with charcoal and ash inclusions (L2)	6	Subsoil (L3, L4)	Infill Layer 1
Infill Layer 1	Light brown sandy loam with charcoal inclusions including thin surficial lenses of black and fire reddened soil (L1) and fire cracked rock	42	Basal Layer	n/a

Plan and Profile Drawings

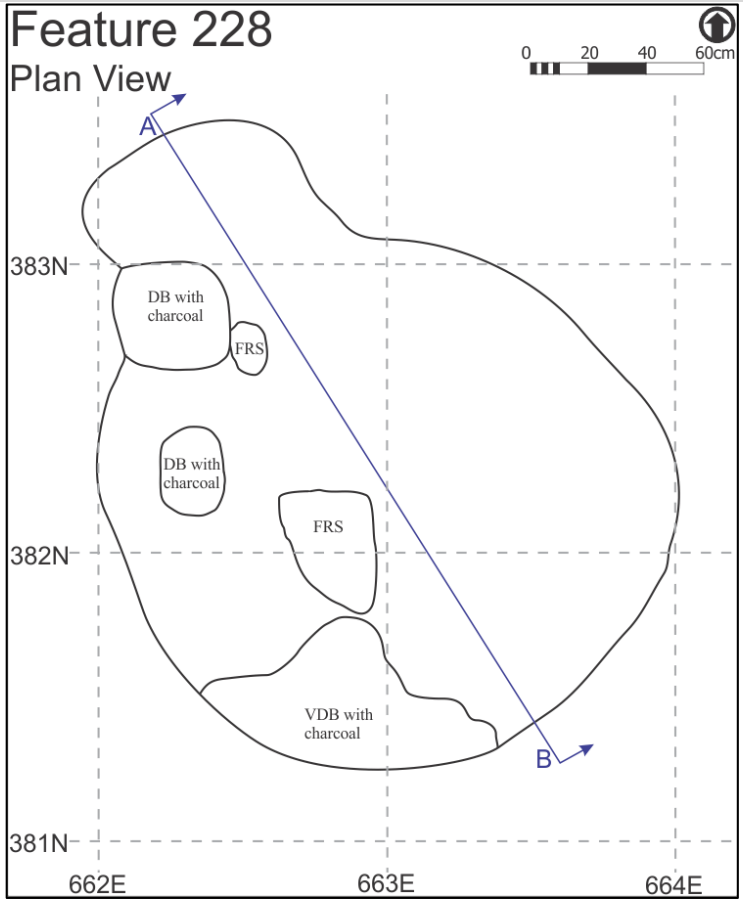


Figure 52 Feature 228 Plan View

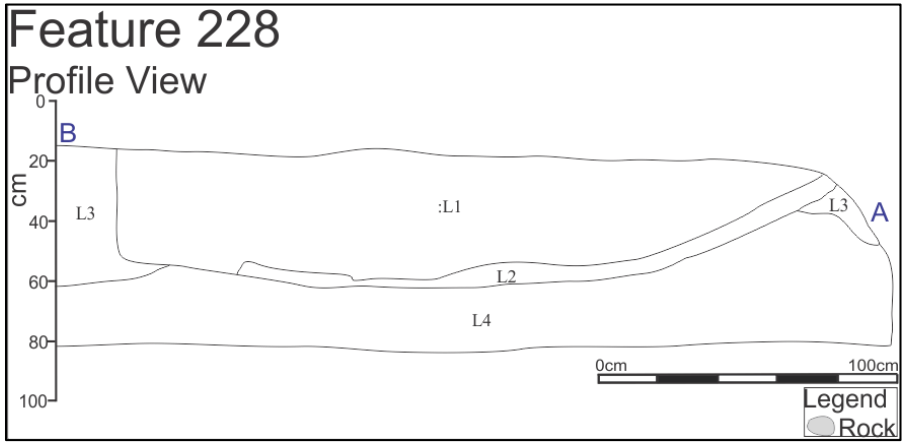
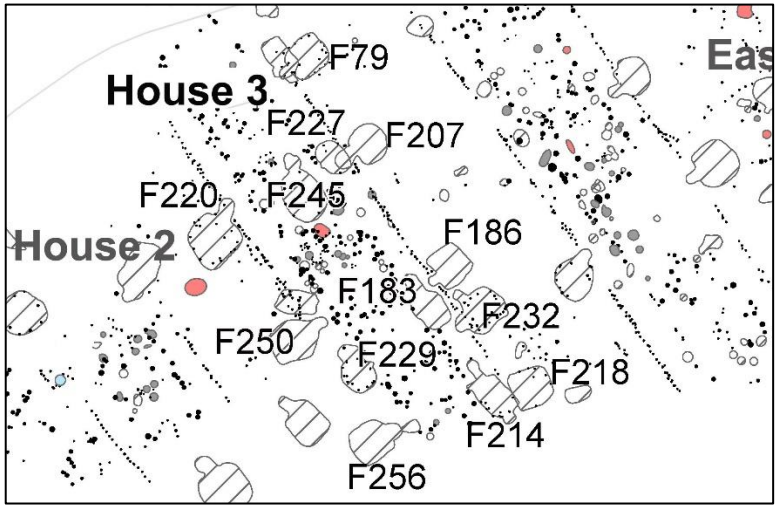


Figure 53 Feature 228 Profiles

Feature 229

Location	
Feature #	229
Location	House 3
Comments	Located in west bunk line; circular in plan view; perimeter posts encountered at base of feature; artifacts of note include two bone awls recovered from the Basal Layer and Infill Layer 2 as well as a plain cylinder ceramic pipe bowl from Refuse Layer 1



Stratigraphy

Layer	Description	Thickness (cm)	Above	Below
Basal Layer	Dark brown to black sandy loam with charcoal and ash inclusions (L5)	10	Construction Layer	Infill Layer 1
Infill Layer 1	Light grey brown sandy loam with charcoal inclusions (L4)	36	Basal Layer	Infill Layer 2 Refuse Layer 1
Infill Layer 2	Very dark brown to black sandy loam with significant charcoal inclusions (L3)	14	Infill Layer 1	Infill Layer 3 Refuse Layer 1
Infill Layer 3	Medium brown sandy loam, no charcoal and ash inclusions (L2)	18	Infill Layer 2	Refuse Layer 1
Refuse Layer 1	Dark brown to black sandy loam with charcoal and as inclusions (L1)	16	Infill Layer 1 Infill Layer 3	n/a
Construction Layer 1	Orange to yellow sandy loam, absence of charcoal inclusions (L6)	10	Subsoil	Basal Layer
Construction Layer 2	Pocket of black to dark brown soils with charcoal inclusions (L7); located within Construction Layer 1, does not meet Basal Layer	5	Subsoil	Construction Layer 1

Plan and Profile Drawings

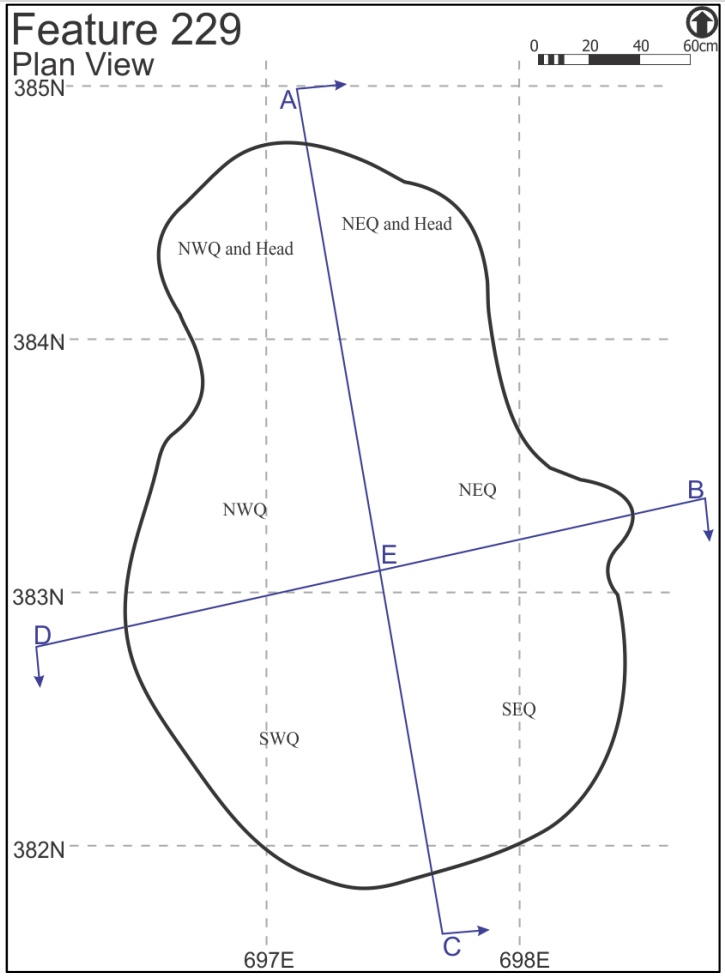


Figure 54 Feature 229 Plan View

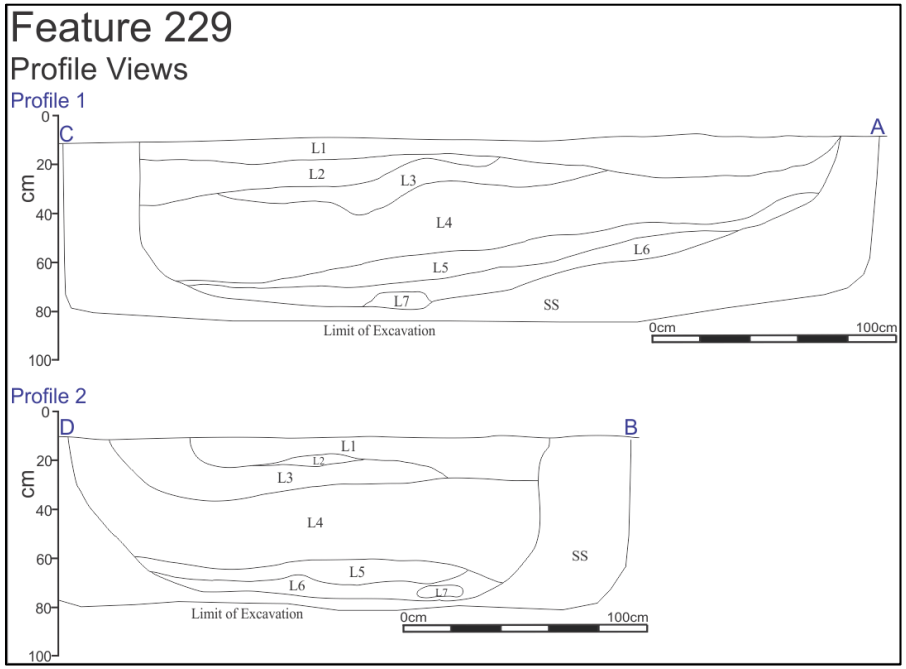
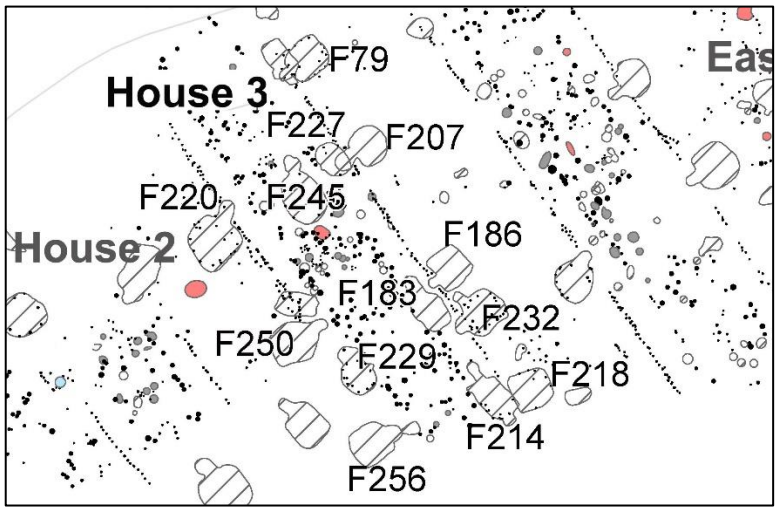


Figure 55 Feature 229 Profiles

Feature 232

Location	
Feature #	232
Location	House 3
Comments	Appended to east wall; rounded square; two ramped entrances including one into house, and one oriented north with access from outside of east wall; likely not in use at the same time as neighbouring SSLs (F183 and F186), given proximity and limited access via ramped entrances; no clear indication whether both ramped entrances were in use simultaneously; artifacts of note include a plain cylinder ceramic pipe bowl with a pointed elbow from Infill Layer 3



Stratigraphy

Layer	Description	Thickness (cm)	Above	Below
Basal Layer	Grey sandy loam with charcoal and ash inclusions (L6 and L7)	5	Subsoil	Infill Layer 1
Infill Layer 1	Light grey brown sandy loam with charcoal inclusions (L5)	21	Basal Layer	Infill Layer 3
Infill Layer 2	Coarse red brown sand (L9); diffuse border with Infill Layer 1	66	Basal Layer Infill Layer 1	Infill Layer 3 Refuse Layer 1
Infill Layer 3	Dark brown and grey sandy loam (L4); located in surface of north ramp and in body of feature	15	Infill Layer 1 Infill Layer 2	Infill Layer 4
Infill Layer 4	Medium dark brown to grey sandy loam (L3A) with yellow sandy loam pockets (L3B) and charcoal inclusions; diffuse border with Infill Layer 2	30	Infill Layer 3	Infill Layer 2
Infill Layer 5	Light medium brown sandy loam with charcoal inclusions (L1)	8	Refuse Layer 1	n/a
Refuse Layer 1	Dark brown to grey sandy loam with charcoal inclusions (L2)	16	Infill layer 2 Infill Layer 4	Infill Layer 5

Plan and Profile Drawings

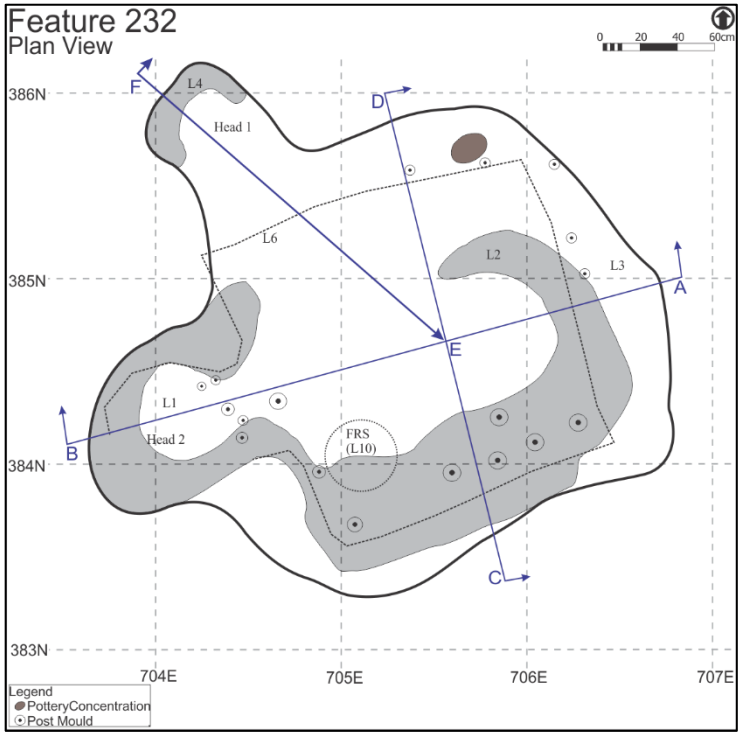


Figure 56 Feature 232 Plan View

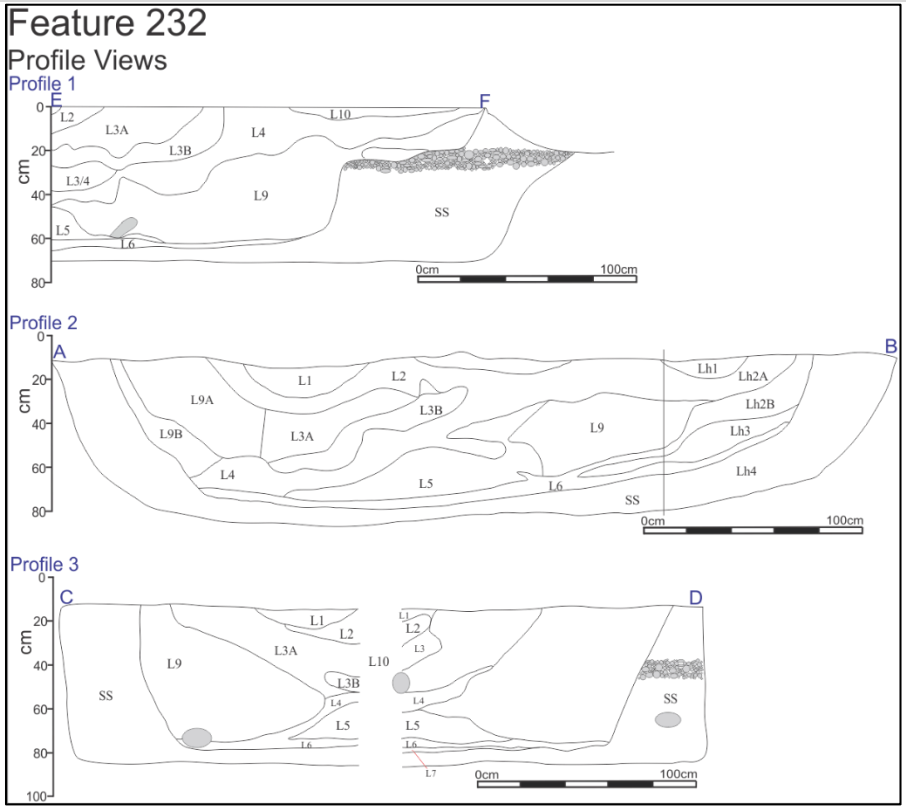
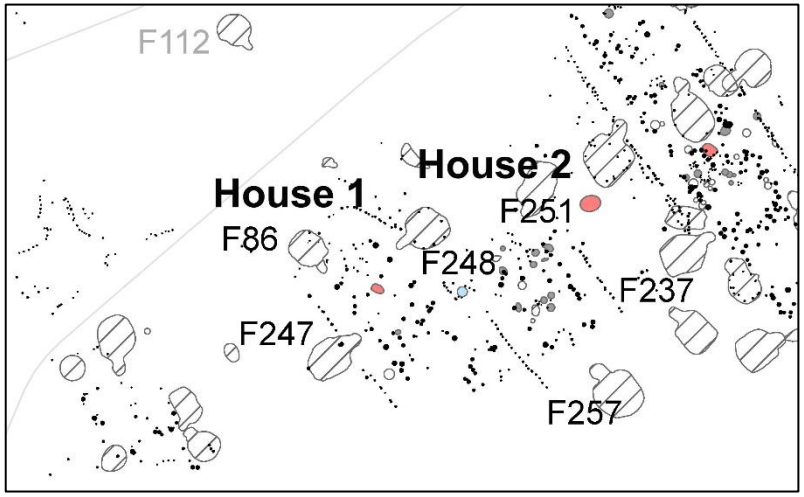


Figure 57 Feature 232 Profiles

Feature 237

Location	
Feature #	237
Location	External to House
Comments	Not associated with a house; located between House 2 and House 3; rounded square in plan view; ramped entrance from northwest; absence of surficial refuse layer; artifacts of note include a bone bead from the rodent disturbances, a bone awl from Infill Layer 1 in the ramped entrance, an antler pressure flaker from the Basal Layer and a ceramic pipe bowl with a pointed elbow from Infill Layer 3



Stratigraphy

Layer	Description	Thickness (cm)	Above	Below
Basal Layer	Dark grey ash with charcoal inclusions (L5)	18	Construction Layer 1	Infill Layer 1
Infill Layer 1	Medium yellow brown sandy loam with charcoal inclusions (L3) with lens of charcoal rich black soil (L4)	50	Basal Layer	Infill Layer 2
Infill Layer 2	Dark brown to black sandy loam (L2)	10	Infill Layer 2	Infill Layer 3
Infill Layer 3	Medium Brown Sandy loam with charcoal inclusions (L1)	26	Infill Layer 2	n/a
Construction Layer 1	Orange to yellow brown sand, hard packed (L6)	3	Subsoil	Basal Layer
Rodent Disturbance	Mottled medium to dark brown sandy loam (L7); disturbance from rodent tunnel	40	n/a	n/a

Plan and Profile Drawings

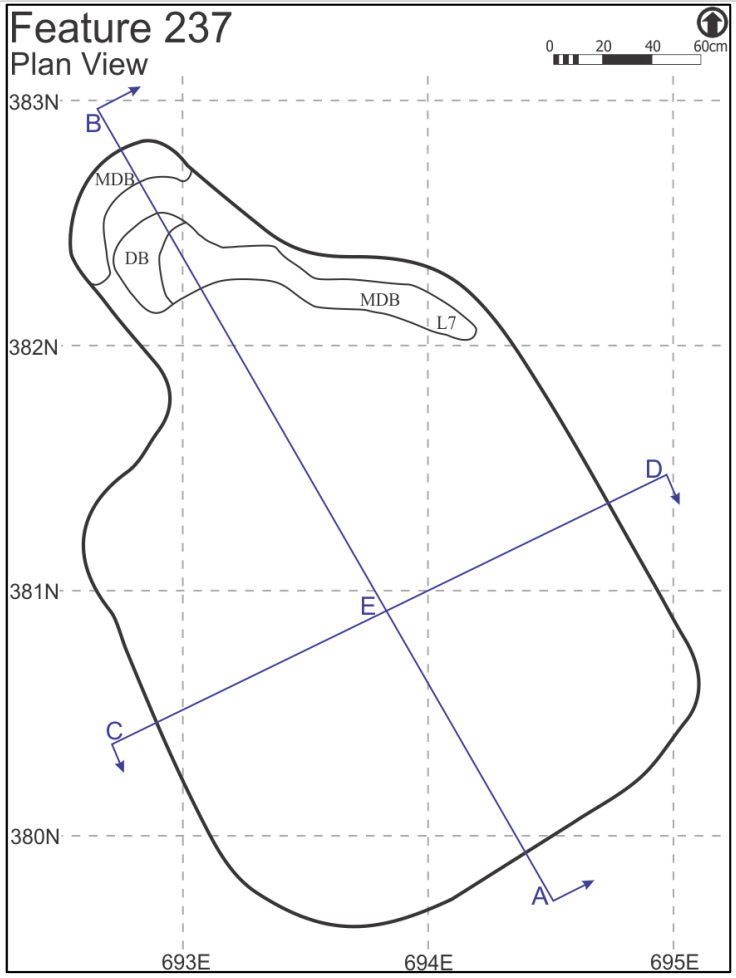


Figure 58 Feature 237 Plan View

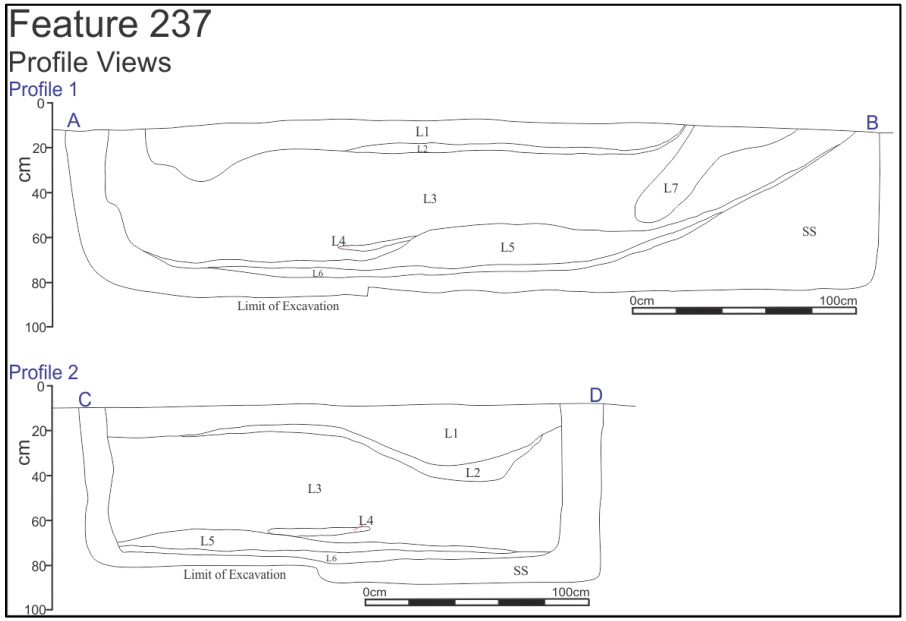
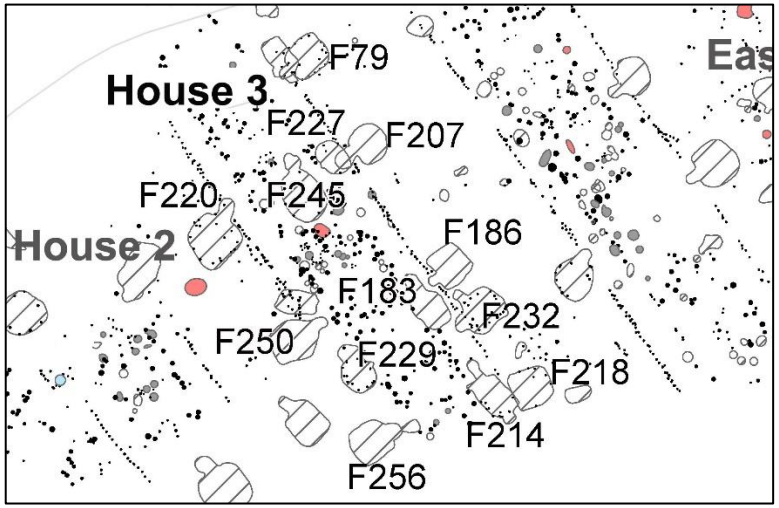


Figure 59 Feature 237 Profiles

Feature 245

Location	
Feature #	245
Location	House 3
Comments	Located within central corridor; ovate in plan view; ramped entrance from northwest; artifacts of include three ceramic pipe fragments (two from Refuse Layer 2, one from Infill Layer 1), four bone beads (three from refuse layers, one from Basal Layer), and four bone awls, (two from refuse layers, two from Basal Layer)



Stratigraphy

Layer	Description	Thickness (cm)	Above	Below
Basal Layer	Dark grey to black sandy loam with ash and charcoal inclusions (L4)	6	Subsoil	Infill Layer 1
Infill Layer 1	Medium yellow brown sandy loam with charcoal inclusions (L3)	50	Basal Layer	Refuse Layer 2
Infill Layer 2	Dark brown sandy loam with charcoal inclusions (L5) located in ramped entrance only; includes large quantities of fire-cracked rock	16	Infill Layer 1	Refuse Layer 2
Refuse Layer 1	Black sandy loam with charcoal inclusions (L2)	15	Infill Layer 1	Refuse Layer 2
Refuse Layer 2	Dark brown sandy loam with charcoal inclusions (L1)	22	Refuse Layer 1	n/a
Rodent Disturbance	Mottled medium to dark brown sandy loam, several rodent tunnels across feature	Variable	n/a	n/a

Plan and Profile Drawings

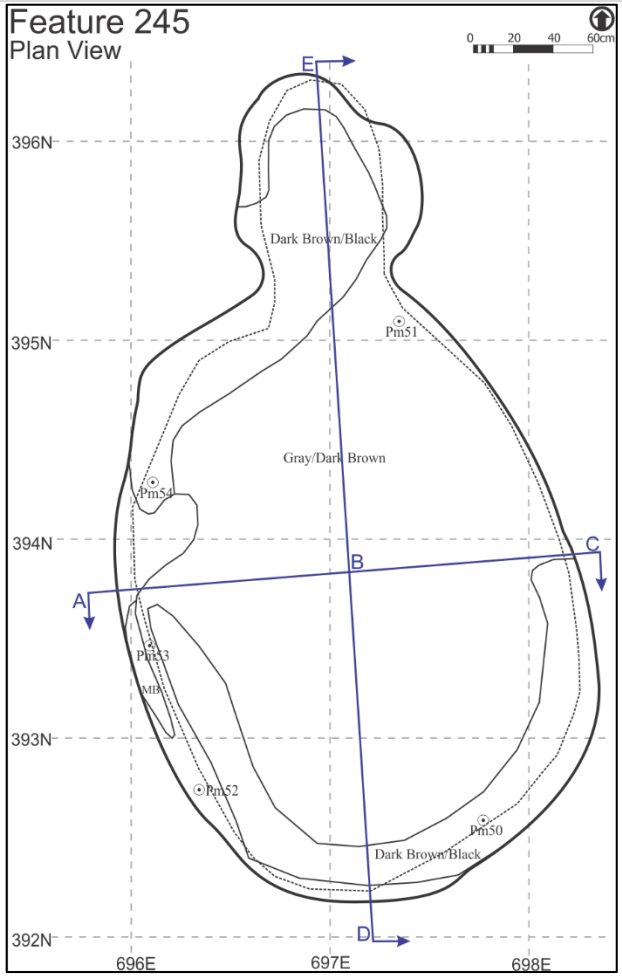


Figure 60 Feature 245 Plan View

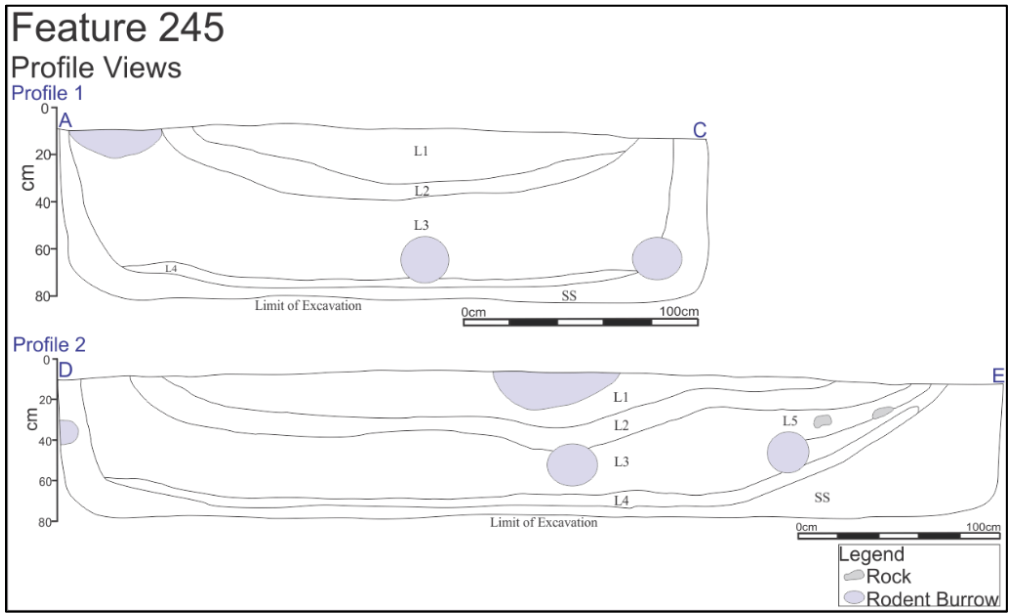
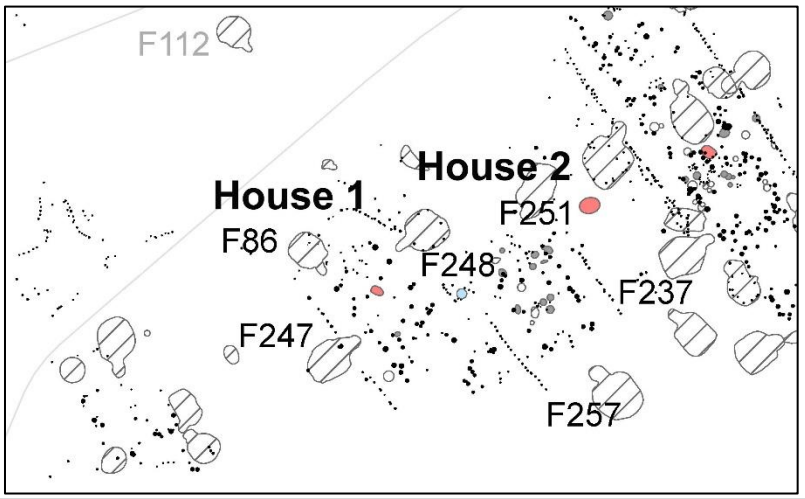


Figure 61 Feature 245 Profiles

Feature 247

Location	
Feature #	247
Location	House 1
Comments	Appended to west wall; rounded square in plan view; surficial disturbance observed; intact pot found in ramped entrance; a single perimeter post found at western edge of feature; no artifacts of note were recovered from this feature; unfortunately, only a single partial profile could be found with the hard copy notes, other profiles appear to be missing



Stratigraphy

Layer	Description	Thickness (cm)	Above	Below
Basal Layer	Dark grey to black ash sandy loam with charcoal inclusions (L7)	7	Construction Layer 1	Infill Layer 1
Infill Layer 1	Medium yellow brown sandy loam (L6), no inclusions, located centrally at bottom of feature	3	Basal Layer	Infill Layer 2
Infill Layer 2	Medium grey ash layer with charcoal inclusions (L5), located centrally at bottom of feature	3	Infill Layer 1	Infill Layer 3
Infill Layer 3	Light to medium light brown subsoil with charcoal inclusions (L4), includes fire cracked rock	74	Basal Layer Infill Layer 3	Infill Layer 4
Infill Layer 4	Light grey ash layer with significant ash and charcoal inclusions (L12) located in ramped entrance only	6	Infill Layer 3	Infill Layer 5
Infill Layer 5	Medium dark grey sandy loam with significant ash inclusions (L11), located in ramped entrance only	24	Infill Layer 4	Infill Layer 6
Infill Layer 6	Medium to orange brown sandy loam with charcoal and ash inclusions (L10), located in ramped entrance only	6	Infill Layer 5	Infill Layer 7
Infill Layer 7	Medium brown sandy loam with charcoal and ash inclusions (L3), includes fire cracked rock	20	Infill Layer 3 Infill Layer 6	Refuse Layer 1

Refuse Layer 1	Black sandy loam with charcoal inclusions (L2)	15	Infill Layer 7	Refuse Layer 2
Refuse Layer 2	Dark brown sandy loam with charcoal inclusions (L1)	22	Refuse Layer 1	n/a
Modern Disturbance	Medium grey brown sandy loam (L13), modern disturbance (includes plastic and other modern garbage	45	Infill Layer 3	n/a
Construction Layer 1	Sterile, light yellow sand, no ash or charcoal inclusions (L8), located above common red sand layer across site	6	Subsoil	Basal Layer

Plan and Profile Drawings

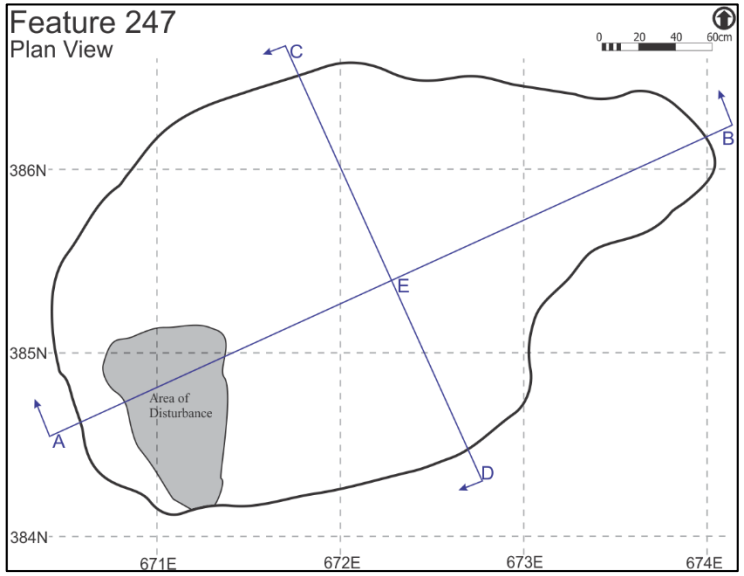


Figure 62 Feature 247 Plan View

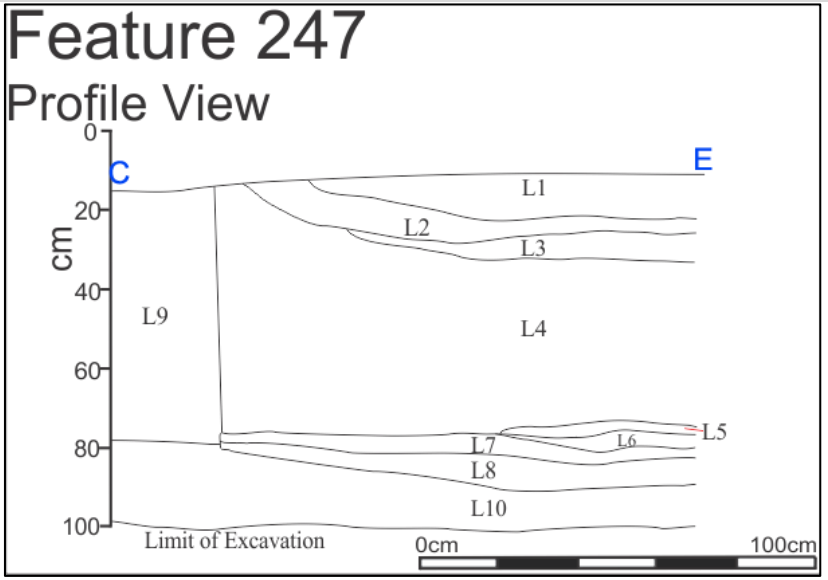
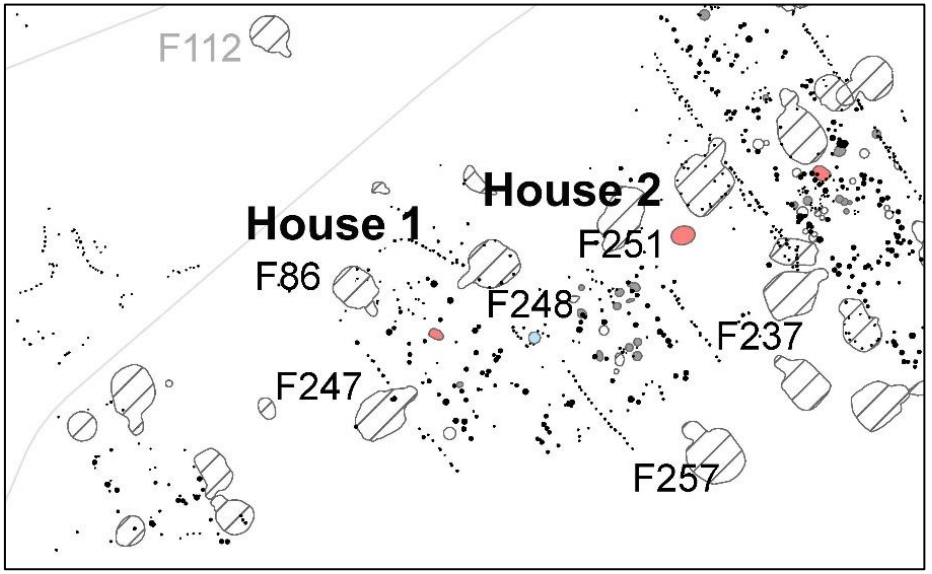


Figure 63 Feature 247 Profile

Feature 248

Location	
Feature #	248
Location	House 1
Comments	Appended to east wall; rounded square in plan view; two basal layers separated by sterile yellow sand layer suggest period of inactivity; artifacts of include a gaming disc (Infill Layer 4), two bone beads (Infill Layer 2 and Infill Layer 5), a bone awl (Infill Layer 1 above Basal Layer 2 a cylinder pipe bowl with punctates (Basal Layer, ramped entrance), a complete plain cylinder pipe and a pipe elbow (Infill Layer 6), a pipe stem and a pipe bowl with punctates (Infill Layer 4), and a plain conical pipe bowl from Refuse Layer 1



Stratigraphy

Layer	Description	Thickness (cm)	Above	Below
Basal Layer 1	Very dark grey to black silt loam with significant ash and charcoal inclusions (L11), extends up ramped entrance	7	Construction Layer 1	Basal Layer 2
Basal Layer 2	Medium grey silt loam with significant ash and charcoal inclusions (L10) with light brown sandy loam lens (L9)	6	Basal Layer 1	Infill Layer 1
Infill Layer 1	Led reddish brown sandy subsoil with charcoal inclusions (L8), main infilling event	70	Basal Layer 2	Infill Layer 2
Infill Layer 2	Thin, very dark brown sandy loam with charcoal inclusions (L7)	5	Infill Layer 1	Infill Layer 3
Infill Layer 3	Yellow brown subsoil (L6) with ash deposit (L14)	17	Infill Layer 2	Infill Layer 4
Infill Layer 4	Medium dark brown (L4) to dark grey brown (L5) sandy loam with ash and charcoal inclusions	20	Infill Layer 3	Infill Layer 6

Infill Layer 5	Orange brown subsoil (L12) with ash deposit (L13)	14	Infill Layer3	Infill Layer 6
Infill Layer 6	Dark grey brown sandy loam with ash and charcoal inclusions (L3)	12	Infill Layer 5	Refuse Layer 1
Refuse Layer 1	Black sandy loam with significant charcoal inclusions (L2)	14	Infill Layer 6	Refuse Layer 2
Refuse Layer 2	Dark brown sandy loam with charcoal inclusions (L1) and a significant ash deposit at interface with Refuse Layer 1	15	Refuse Layer 1	n/a
Construction Layer 1	Sterile, light yellow sand, no ash or charcoal inclusions (L15), located above common red sand layer across site	6	Subsoil	Basal Layer 1

Plan and Profile Drawings

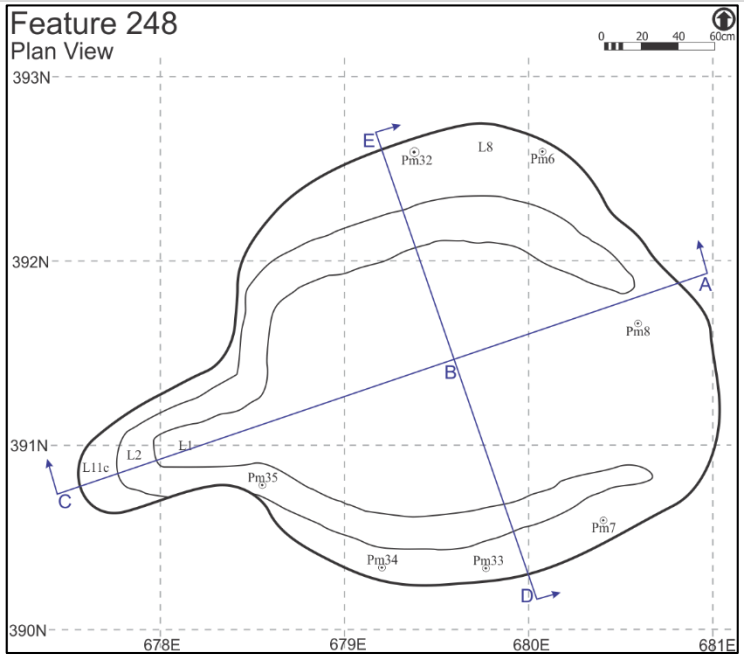


Figure 64 Feature 248 Plan View

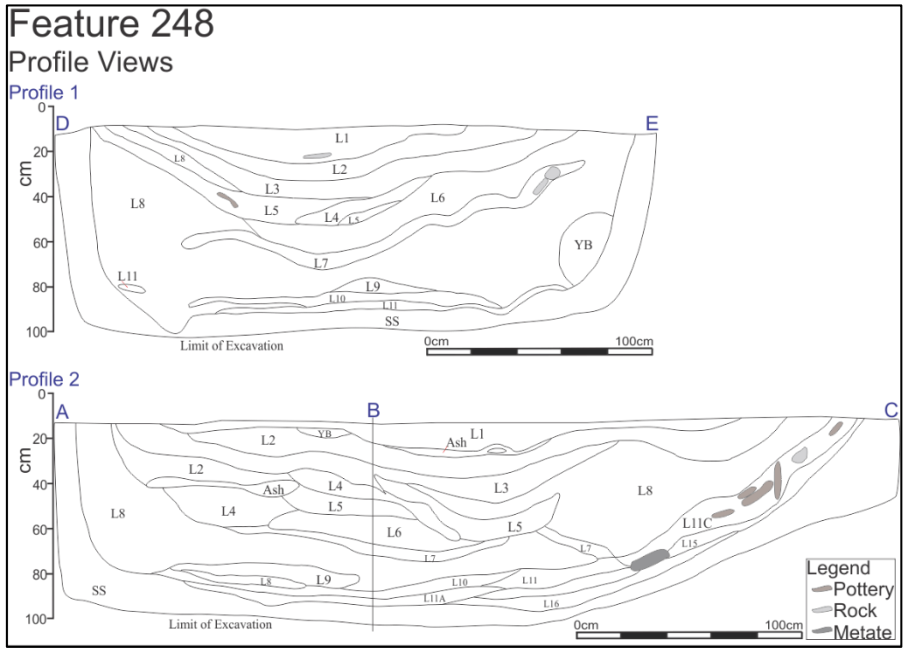
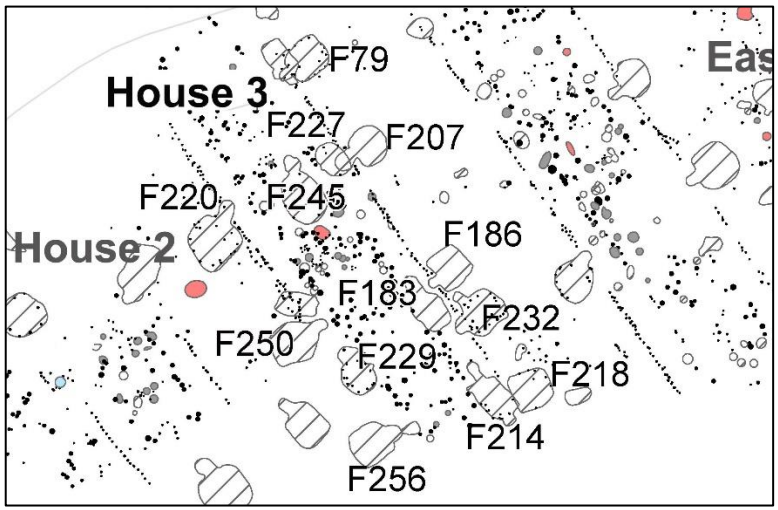


Figure 65 Feature 248 Profiles

Feature 250

Location	
Feature #	250
Location	House 3
Comments	Appended to west wall; rounded square in plan view; adjacent to large storage pit; **a**rtifacts of note include a bone pin and two bone awls from Infill Layer 1 in the ramped entrance, above the Basal Layer, and a third bone awl recovered from Infill Layer 3 in the ramped entrance, within the light grey ash deposit



Stratigraphy

Layer	Description	Thickness (cm)	Above	Below
Basal Layer 1	Medium to dark grey ash layer with significant charcoal inclusions (L5), extends up ramped entrance, where it is deeper (~12 cm)	3	Construction Layer 1	Infill Layer 1
Infill Layer 1	Light brown sandy loam, few inclusions (L3); includes small pocket of fire reddened soil (L4) along western margin of feature, just above the basal Layer	54	Basal Layer 1	Infill Layer 2
Infill Layer 2	Fire reddened soil (L4) along south margin of feature; sterile	12	Basal Layer 1	Infill Layer 2
Infill Layer 3	Medium grey ash layer within significant charcoal inclusions (L9) with a layer of light grey ash (L8); located in head only	21	Infill Layer 2	Infill Layer 4
Refuse Layer 1	Black sandy loam with significant charcoal inclusions (L2)	11	Infill Layer 1 Infill Layer 2 Infill Layer 3	Refuse Layer 2
Refuse Layer 2	Dark brown sandy loam with charcoal inclusions (L1)	2	Refuse Layer 1	n/a

Construction Layer 1	Sterile, light yellow to orange sand, hard packed, no inclusions (L6), located above common red sand layer across site	2	Subsoil	Basal Layer 1

Plan and Profile Drawings

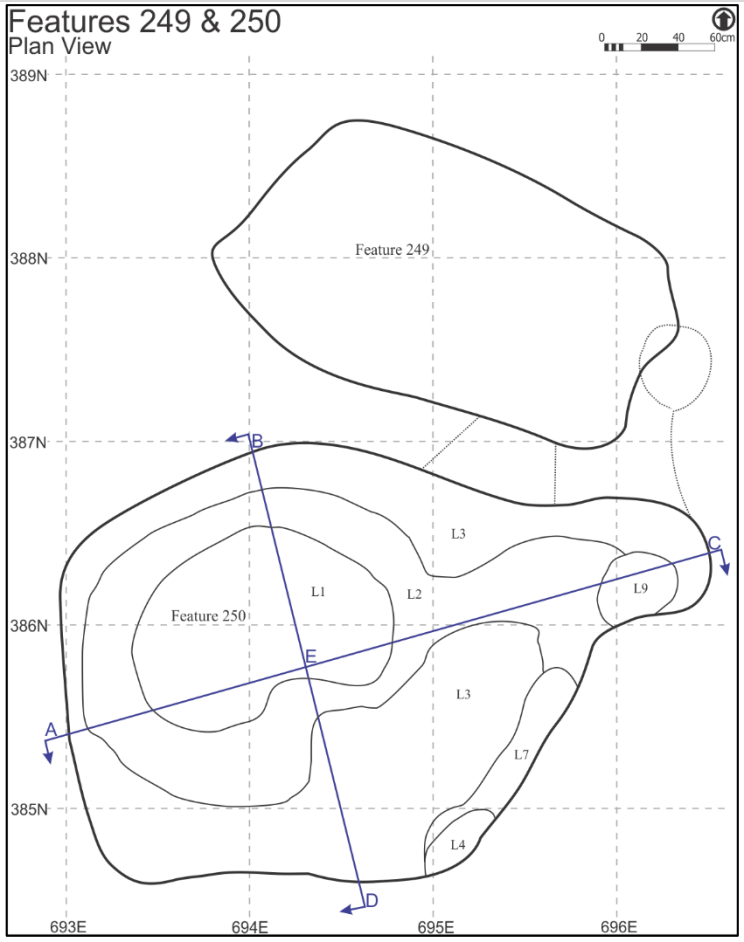


Figure 66 Feature 250 Plan View

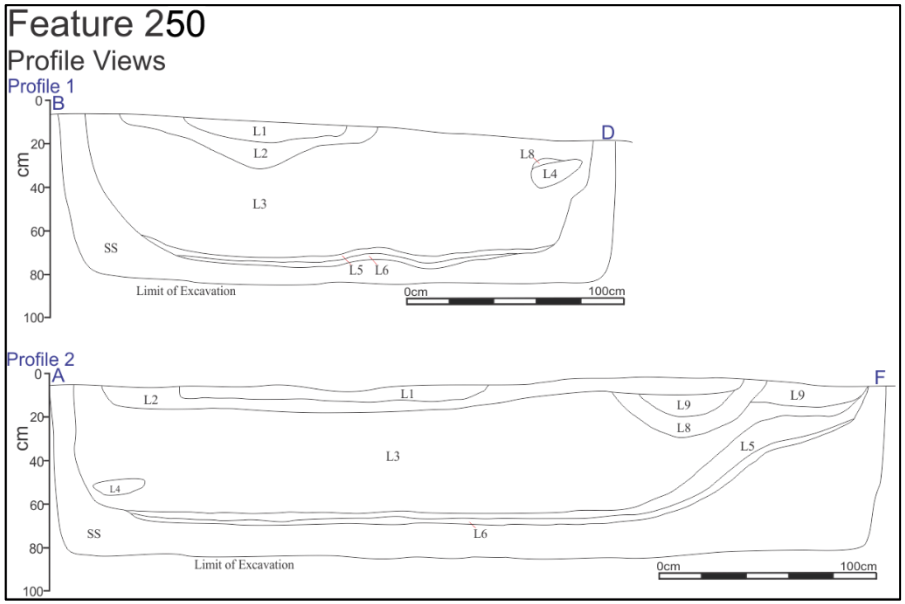
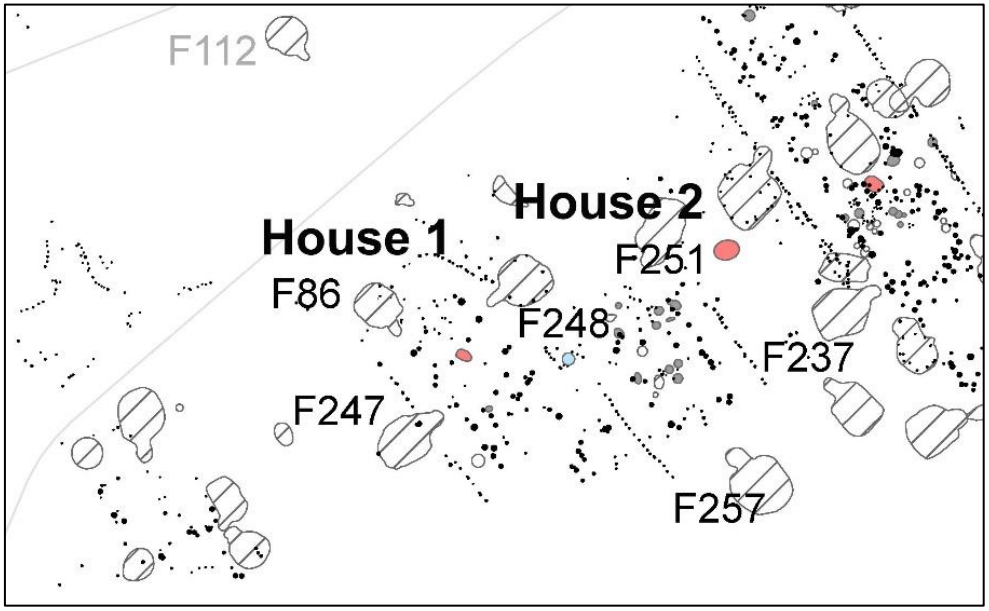


Figure 67 Feature 250 Profiles

Feature 251

Location	
Feature #	251
Location	House 2
Comments	Appended to east wall of House 2; rounded square in plan view; artifacts of note include a ceramic pipe stem and bowl (Refuse Layer 1) and a complete miniature pipe (Refuse Layer 2), one steatite pipe bowl (Refuse Layer 1) and a second steatite pipe bowl (Refuse Layer 2), six bone beads (two in Basal Layer, one in Infill Layer 3, two in Refuse Layer 2, one in Refuse Layer 1), and four bone awls (two in Basal Layer, one in Infill Layer 3, and one in Refuse Layer 1).



Stratigraphy

Layer	Description	Thickness (cm)	Above	Below
Basal Layer 1	Light to medium grey ash layer with significant charcoal inclusions (L 14, L16 and L17),	20	Subsoil	Infill Layer 1
Infill Layer 1	Medium grey brown sandy loam with charcoal inclusions (L11, L13, and L15), and lens of dark brown sandy loam with charcoal inclusions (L12)	20	Basal Layer 1	Infill Layer 2
Infill Layer 2	Dark brown sandy loam with charcoal inclusions and fire cracked rock (L10)	8	Infill Layer 1	Infill Layer 3
Infill Layer 3	Light brown to yellow brown sand with charcoal inclusions (L6 and L9)	50	Infill Layer 2	Infill Layer 4 Infill Layer 5
Infill Layer 4	Medium dark brown sandy loam with charcoal inclusions (L8)	6	Infill Layer 3	Infill Layer 5
Infill Layer 5	Ashy light grey sandy loam with charcoal inclusions (L7)	10	Infill Layer 3 Infill Layer 4	Refuse Layer 1

Refuse Layer 1	Black sandy loam with significant charcoal inclusions and lenses of yellow sandy subsoil (L2-L5, L19-L23)	14	Infill Layer 5	Refuse Layer 2
Refuse Layer 2	Dark brown sandy loam with charcoal inclusions (L1)	22	Refuse Layer 1	n/a

Plan and Profile Drawings

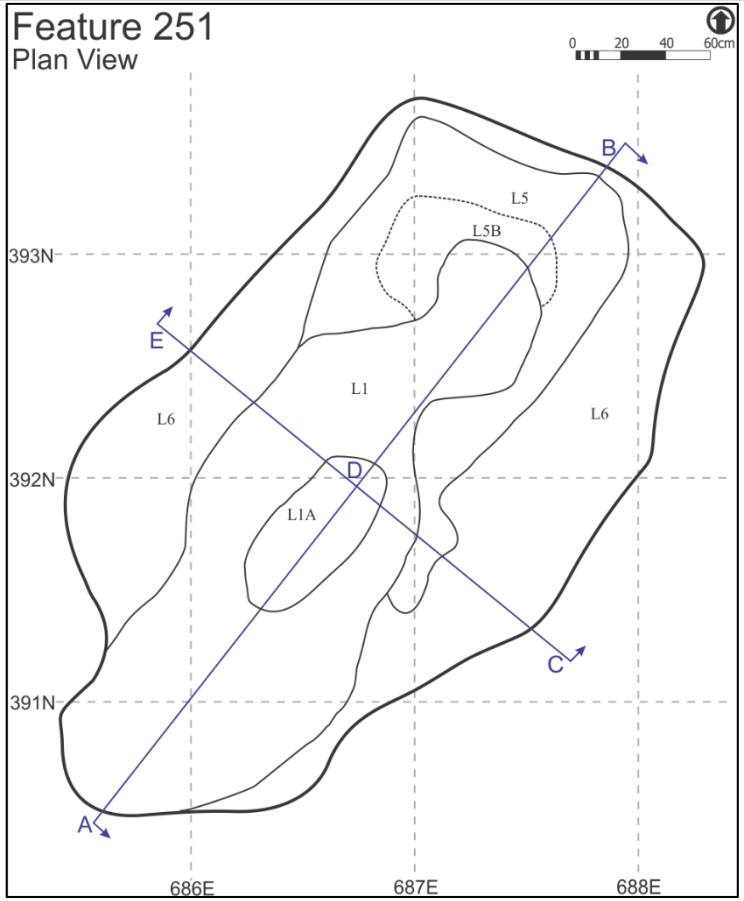


Figure 68 Feature 251 Plan View

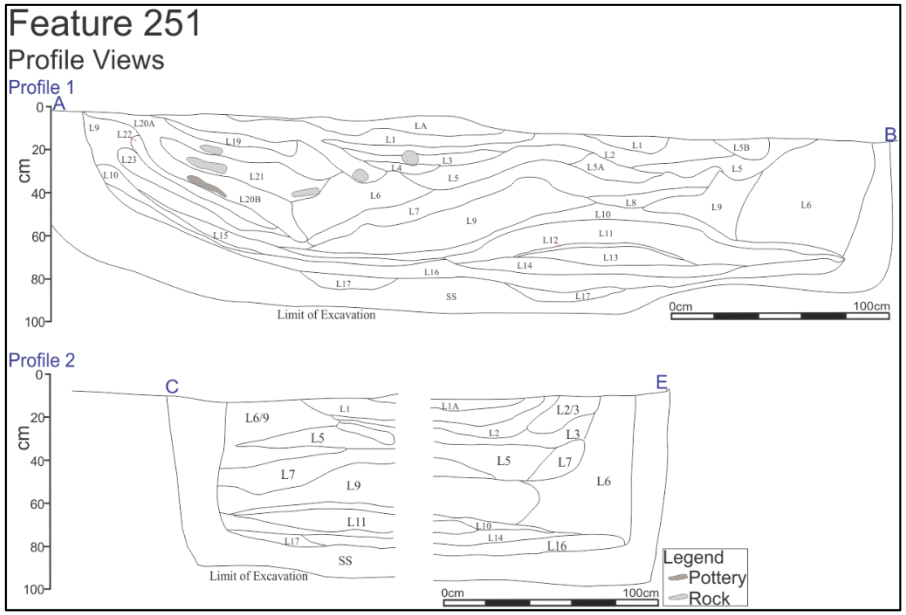
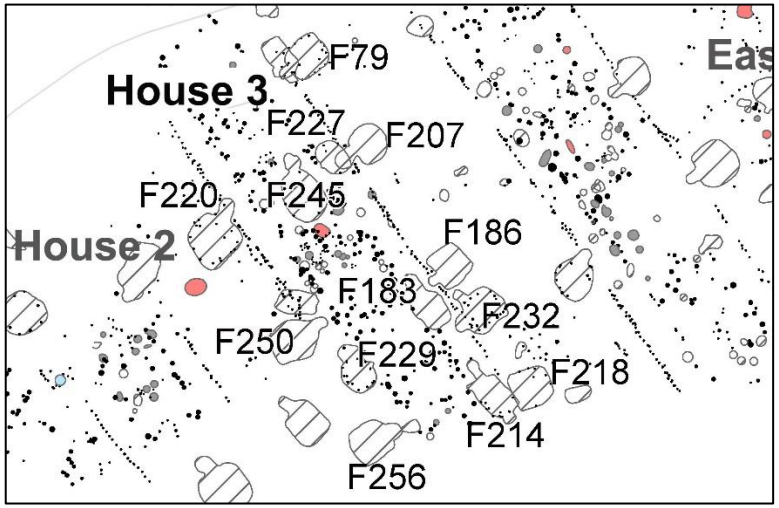


Figure 69 Feature 251 Profiles

Feature 256

Location	
Feature #	256
Location	House 3
Comments	Appended to west wall; rounded square in plan view; ramped entrance intersects with F258, a small refuse pit located under the west bunk link of House 3; no surficial refuse layers present; while no artifacts of note were recovered from Feature 256, the ramped entrance of the feature intersected with a small refuse pit which contained a complete miniature pipe; the relationship between these two features is not known



Stratigraphy

Layer	Description	Thickness (cm)	Above	Below
Basal Layer 1	Medium grey ash layer with significant charcoal inclusions (L6), extends up ramped entrance; included fire cracked rock	3	Construction Layer 1	Infill Layer 1
Infill Layer 1	Medium to dark grey sandy loam with significant charcoal inclusions (L5), interrupted by a sterile layer of yellow sand	10	Basal Layer 1	Infill Layer 2
Infill Layer 2	Medium red brown sandy loam with charcoal inclusions (L2, L4 and L8) intersected by a discontinuous, sterile, dark grey brown sandy loam (L3); extends up ramped entrance	70	Infill Layer 1	Infill Layer 3
Infill Layer 3	Medium brown loam with charcoal inclusions (L1), nearly indistinguishable from surrounding subsoil	40	Infill Layer 2	n/a
Construction Layer 1	Sterile, light yellow to orange sand, hard packed, no inclusions (L7), located above common red sand layer across site	2	Subsoil	Basal Layer 1

Plan and Profile Drawings

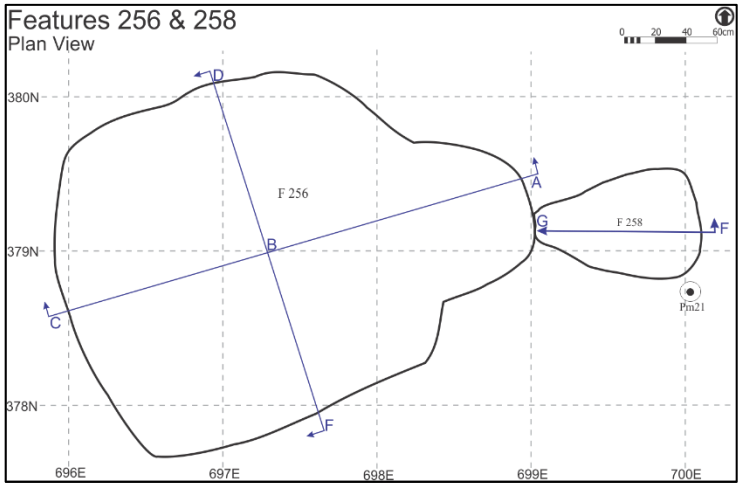


Figure 70 Feature 256 Plan View

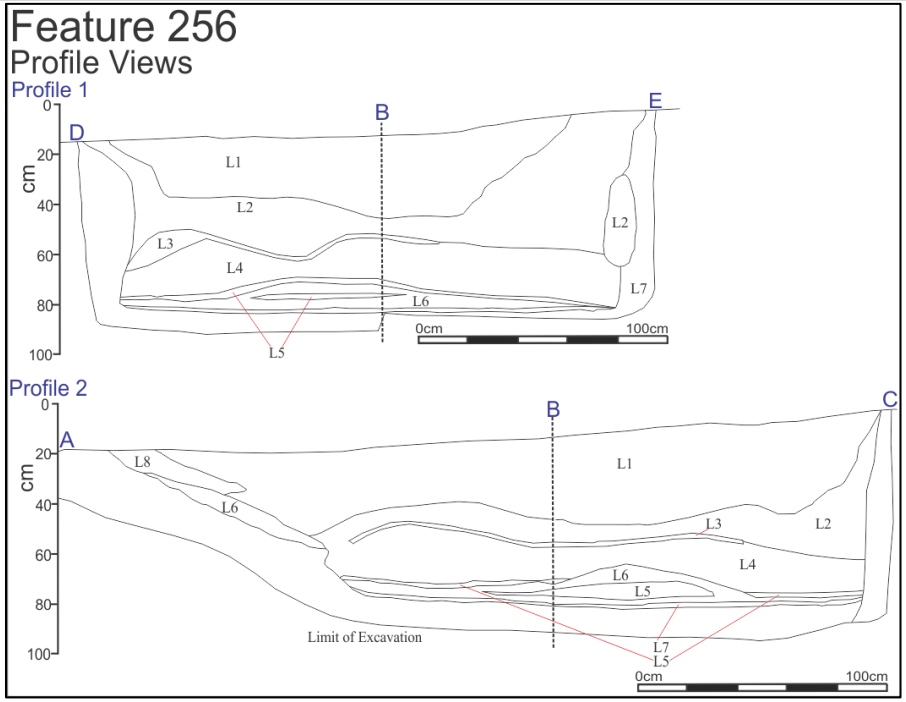
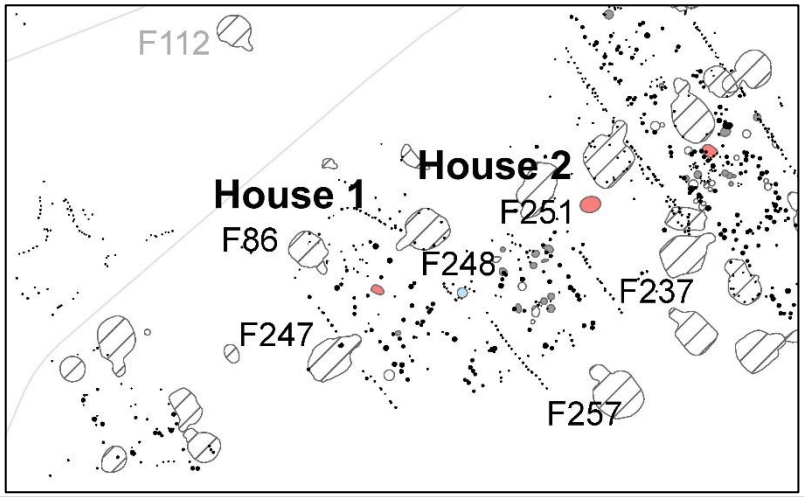


Figure 71 Feature 256 Profiles

Feature 257

Location	
Feature #	257
Location	House 2
Comments	Located within central corridor; poor settlement patterns in this area due to road construction; circular in plan view; artifacts of note include a copper disc (Infill Layer 3, ramped entrance), a bone awl recovered (Infill Layer 1, ramped entrance), and a slate gorge (Infill Layer 3, ramped entrance)



Stratigraphy

Layer	Description	Thickness (cm)	Above	Below
Basal Layer 1	Light grey ash layer with significant charcoal inclusions (L4), extends up ramped entrance	7	Construction Layer 1	Infill Layer 1
Infill Layer 1	Medium grey to dark grey clay loam with ash and charcoal inclusions (L6), located in ramped entrance only, fire cracked rock	20	Basal Layer 1	Infill Layer 2
Infill Layer 2	Dark brown silt loam with charcoal inclusions (L5), located in ramped entrance only, fire cracked rock	24	Basal Layer 1 Infill Layer 1	Infill Layer 3
Infill Layer 3	Medium light brown sandy loam with charcoal inclusions (L3)	68	Basal Layer, Infill Layer 2	Refuse Layer 1
Refuse Layer 1	Very dark brown to black silt loam with significant charcoal inclusions (L2)	10	Infill Layer 3	Refuse Layer 2
Refuse Layer 2	Medium to dark brown loam with charcoal inclusions (L1)	18	Refuse Layer 1	n/a
Construction Layer 1	Sterile, light yellow sand, hard packed, no inclusions (L7), located primarily in ramped entrance, extends slightly into body	7	Subsoil	Basal Layer 1

Plan and Profile Drawings

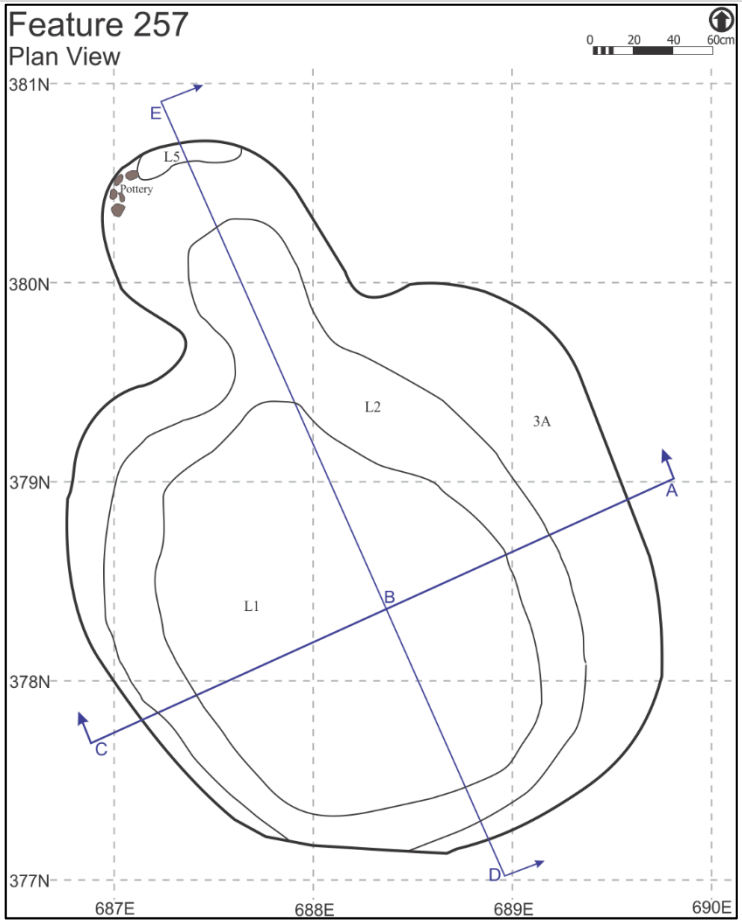


Figure 72 Feature 257 Plan View

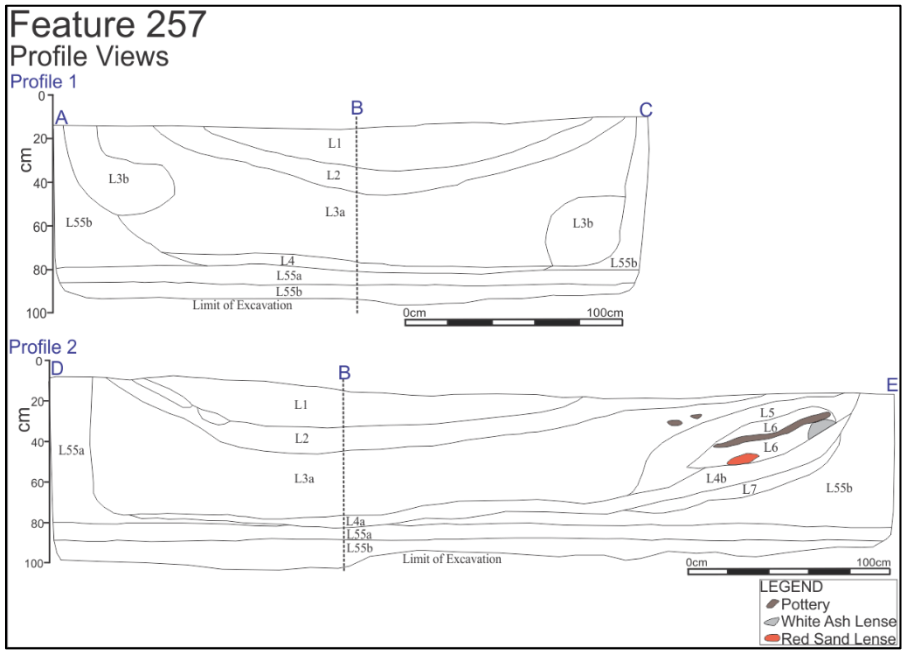


Figure 73 Feature 257 Profiles

APPENDIX II: Redeemer Site SSL Spatial, Morphological, and Artifact Data

Table 32: Redeemer Site SSL Spatial and Morphological Data

F#	Location	Alignment	Total Length (cm)	Width (cm)	Depth (cm)	Body Length (cm)	Ramped Entrance Length (cm)	Ramped Entrance Width (cm)	Ramped Entrance Depth (cm)	Basal Layer Thickness (cm)	Perimeter Posts	Area (m2)
3	South House	Appended	350	220	55	220	130	90	53	4	Present	4.26
18	South House	Unknown	190	85	51	141	49	36	n/a	n/a	Absent	1.44
23	South House	Appended	268	160	66	172	96	80	60	7	Absent	4.18
24	Exterior to House	n/a	380	280	87	279	101	74	72	12	Present	6.26
31	Exterior to House	n/a	320	220	60	228	92	71	40	9	Present	3.91
45	House 5	Appended	300	225	17	230	70	56	17	n/a	Present	4.27
74	House 4	Appended	296	385	40	192	104	90	30	6	Absent	3.98
79	House 3	Appended	342	220	64	262	80	62	44	7	Present	4.84
86	House 1	Appended	290	203	65	216	74	50	48	7	Present	4.18
104	House 4	Appended	340	225	65	250	90	72	52	7	Present	4.27
112	Exterior to House	n/a	258	190	28	198	60	42	26	10	Absent	3.18
120	Northwest House	Appended	360	220	85	252	108	96	60	8	Absent	3.62
134	West House	Appended	380	220	60	270	110	96	54	9	Absent	5.54
135	East House	Appended	335	226	83	237	98	70	68	5	Present	5.69
140	East House	Unknown	280	195	55	200	80	58	42	10	Absent	4.03
141	East House	Unknown	380	220	38	306	74	44	16	3	Absent	4.34
169	House 4	Appended	300	258	52	220	80	60	32	3-14	Absent	5.82
183	House 3	Bunk Line	375	190	68	235	140	84	56	9	Present	4.24
186	House 3	Appended	310	220	50	238	72	58	40	9	Present	4.64
206	House 4	Appended	302	222	80	216	86	74	56	4	Present	4.47
207	House 3	Appended	421	225	70	291	130	104	58	7	Absent	2.71
214	House 3	Bunk Line	433	184	70	313	120	64	30	3	Present	5.45
218	House 3	Bunk Line	246	234	68	n/a	n/a	n/a	n/a	12	Present	4.77
220	House 3	Bunk Line	422	300	76	302	120	88	68	5	Present	7.67
227	House 3	Bunk Line	210	152	46	n/a	n/a	n/a	n/a	4	Absent	4.81
228	West House	Bunk Line	244	184	43	176	68	74	36	6	Absent	3.26
229	House 3	Bunk Line	296	191	69	208	88	120	52	10	Present	4.24
232	House 3	Appended	328	224	68	248	80	56	22	5	Present	5.97
237	Exterior to House	n/a	332	204	72	238	94	66	58	18	Absent	5.28

F#	Location	Alignment	Total Length (cm)	Width (cm)	Depth (cm)	Body Length (cm)	Ramped Entrance Length (cm)	Ramped Entrance Width (cm)	Ramped Entrance Depth (cm)	Basal Layer Thickness (cm)	Perimeter Posts	Area (m2)
245	House 3	Central Corridor	428	258	68	328	100	100	62	6	Present	6.44
247	House 1	Appended	370	223	80	280	90	84	68	7	Present	5.75
248	House 1	Appended	346	244	81	242	104	60	65	7	Present	5.60
250	House 3	Appended	362	234	68	292	70	72	60	3	Absent	5.95
251	House 2	Appended	368	200	80	308	60	82	71	20	Present	5.69
256	House 3	Appended	308	220	71	248	60	100	40	3	Absent	5.24
257	House 2	Central Corridor	382	248	67	278	104	98	52	7	Absent	7.20

Table 33: Redeemer Site SSL Artifact Summary – Total Assemblage and Breakdown of Artifacts of Significance by Feature

F#	House/ External to House	Total SSL Recovered Assemblage	Total Artifacts of Significance	Total Pipes	Total Bone Pins	Total Copper Objects	Total Bone Beads	Total Unique Stone Objects	Total Bone Awls	Total Bone Toggles	Total Bone Bracelets
3	South House	197	4	3	0	0	0	1	0	0	0
18	South House	3	0	0	0	0	0	0	0	0	0
23	South House	89	0	0	0	0	0	0	0	0	0
24	Exterior to House	276	0	0	0	0	0	0	0	0	0
31	Exterior to House	326	3	3	0	0	0	0	0	0	0
45	House 5	547	0	0	0	0	0	0	0	0	0
74	House 4	57	0	0	0	0	0	0	0	0	0
79	House 3	839	3	2	0	0	1	0	0	0	0
86	House 1	3401	19	3	0	1	7	1	5	2	0

F#	House/ External to House	Total SSL Recovered Assemblage	Total Artifacts of Significance	Total Pipes	Total Bone Pins	Total Copper Objects	Total Bone Beads	Total Unique Stone Objects	Total Bone Awls	Total Bone Toggles	Total Bone Bracelets
104	House 4	596	5	3	0	0	0	2	0	0	0
112	Exterior to House	130	0	0	0	0	0	0	0	0	0
120	Northwest House	538	1	1	0	0	0	0	0	0	0
134	West House	1169	5	2	0	0	0	0	2	0	1
135	East House	943	4	2	1	0	0	1	0	0	0
140	East House	651	1	1	0	0	0	0	0	0	0
141	East House	364	0	0	0	0	0	0	0	0	0
169	House 4	420	0	0	0	0	0	0	0	0	0
183	House 3	876	6	2	0	0	0	1	3	0	0
186	House 3	753	3	0	0	0	0	0	3	0	0
206	House 3	955	2	1	0	0	0	0	1	0	0
207	House 3	817	4	1	0	0	0	0	3	0	0
214	House 3	1345	11	5	0	0	1	0	4	1	0
218	House 3	752	7	5	0	1	0	0	1	0	0
220	House 3	784	1	1	0	0	0	0	0	0	0
227	House 3	132	2	0	0	0	0	0	1	1	0
228	West House	220	1	1	0	0	0	0	0	0	0
229	West House	773	3	1	0	0	0	0	2	0	0
232	House 3	845	4	4	0	0	0	0	0	0	0
237	Exterior to House	394	2	0	0	0	1	0	1	0	0
245	House 3	2010	11	3	0	0	4	0	4	0	0
247	House 1	470	0	0	0	0	0	0	0	0	0
248	House 1	2367	10	7	0	0	2	0	1	0	0
250	House 3	994	4	0	1	0	0	0	3	0	0
251	House 2	2049	15	3	0	0	6	2	4	0	0
256	House 3	111	0	0	0	0	0	0	0	0	0
257	House 2	933	3	0	0	1	0	1	1	0	0
	TOTAL	**28126**	**134**	**54**	**2**	**3**	**22**	**9**	**39**	**4**	**1**

Table 34: Redeemer Site SSL Artifacts of Significance by Feature Type

	Feature Type												
Artifact Type	**Ash Pit**	**Hearth**	**Midden**	**Other**	**Post Mould**	**Refuse Pit**	**Refuse/ Ash**	**Refuse/ Midden**	**Refuse/ Storage**	**Special Purpose**	**Storage Pit**	**SSL**	**Total**
Awl (bone, antler)	0	0	4	0	3	1	0	0	0	1	0	39	**48**
Bone Bead	1	0	1	0	1	3	1	0	0	0	0	22	**29**
Bone Bracelet	0	0	0	0	0	0	0	0	0	0	0	1	**1**
Bone Pin/Bodkin	0	0	0	0	0	1	0	0	0	0	2	2	**5**
Bone Toggle	0	0	1	0	0	0	0	0	0	0	0	4	**5**
Ceramic Pipes	1	0	20	11	13	6	0	1	0	3	2	54	**111**
Copper Object	0	0	0	0	0	0	0	0	0	0	0	3	**3**
Stone Object	0	0	3	0	0	0	0	0	0	1	0	9	**13**
Total	**2**	**0**	**29**	**11**	**17**	**11**	**1**	**1**	**0**	**5**	**4**	**134**	**215**

Table 35: Redeemer Site SSL Total Number of Artifacts of Significance by House Location and Feature Type

	Feature Type (in Houses)											
Location	**Ash Pit**	**Hearth**	**Other**	**Post Mould**	**Refuse Pit**	**Refuse/ Ash**	**Refuse/ Midden**	**Refuse/ Storage**	**Storage Pit**	**SSL**	**Total # of Artifacts of Significance from Houses**	**Total # of Artifacts from Houses**
East House	0	0	0	0	3	0	0	0	0	5	**8**	**2248**
House 1	0	0	0	0	0	0	0	0	0	29	**29**	**6240**
House 2	0	0	0	2	0	1	0	0	0	20	**23**	**3284**
House 3	1	0	0	12	2	0	0	0	0	57	**72**	**11712**
House 4	2	0	0	1	4	0	0	0	1	7	**15**	**4248**
House 5	0	0	0	0	0	0	0	0	0	0	**0**	**568**
South House	0	0	0	0	0	0	0	0	0	6	**6**	**722**
West House	0	0	0	2	0	0	0	0	3	6	**11**	**1835**

	Feature Type (in Houses)											
Location	**Ash Pit**	**Hearth**	**Other**	**Post Mould**	**Refuse Pit**	**Refuse/ Ash**	**Refuse/ Midden**	**Refuse/ Storage**	**Storage Pit**	**SSL**	**Total # of Artifacts of Significance from Houses**	**Total # of Artifacts from Houses**
Northwest House	0	0	0	0	0	0	0	0	0	1	**1**	**538**
Total	**3**	**0**	**0**	**17**	**9**	**1**	**0**	**0**	**4**	**131**	**165**	**n/a**
Total # of Artifacts per Feature Type (in Houses)	**983**	**37**	**10**	**295**	**1871**	**149**	**196**	**421**	**27433**	**983**	**n/a**	**31395**

APPENDIX III: Redeemer Site Artifact Provenience Tally

	Ceramic Pipe					Ceramic Vessel					Debitage	Floral										Formal Tool							Ground, Pecked, Polished, Other			Informal Tool				Misc. Ceramics		Modified Copper	Modified Faunal			Unmodified Faunal									
SSL #	Bowl	Complete Pipe	Elbow	Mouth	Stem	Body herd	Juvenile Sherds	Neck/Shoulder	Rimsherd	Rimsherd - Fragment	Flake	Acorn	Bean?	Butternut	Indet cult	Indet nut shell	Juglans	Squash	Sunflower	Walnut	Wood	Zea mays	Biface	Core	Drill	Preform	Projectile Point	Scraper	Uniface	Groundstone	Other Stone	Pecked	Core	Retouched Flake	Utilized Flake	Wedge	Gaming Disc	Waste	Copper Object	Antler Object	Bone Object	Miscellaneous Bone	Aves	Bivalvia	Indeterminate	Mammalia	Mammalia, Artiodactyla	Mammalia, Carnivora	Mammalia, Rodentia	Osteichthyes	Reptilia	Reptilia, Testudines	Total
F3	3						3		165	2	39																		1																					**439**
F18											2																		1																				**6**
F23								40	3		80													1					1				7																**278**
F24								4	12	2	249												3				1						2		2			1												**389**
F31	3						1	9	9		293												2				1		1	2			2		3																**423**
F45									2	4	125																						3		1										203	209						**547**
F74								3	11		36											1					1						1	1	1	1								1						**57**
F79	1			1				75	47	18	376										4	24	3					3		1			1	4	2	3					1		15			244				16			**839**
F86	1			2					40	17	688										1	5	1			1	2				1		4	2	15	5			1		14		912		84	385				1189		31	**3401**
F104	3							10	18	9	358												2							1	2		1	5	1	1								73	112							**596**
F112									9	1	79																1							1	1										38						**130**
F120				1					2	8	393										62	2	1							3			1	2	4	1							4		36	16				2			**538**
F134				2				10	56	5	284										1		1		1		2	2				2	4	8	2					3				58	123				502	103		**1169**
F135				2				2	4	10	653																1	1					2	3	1	1					1		45		12	175				26	1		**943**
F140	1								19	2	417			2							36		3				1	1					5	1	7	2									78	65				7	4		**651**
F141									14	1	134										7												1	1									68		65	64				9			**364**
F169									9	4	341												2				1							3	1	2										57						**420**
F183			1	1				1	14	14	639										12	1	4		2			1		2	1		1	9	11	3				1	2		19		43	82				12			**876**
F186									9	1	244				2						1	6	1				1						1		2					3		45		32	396				9			**753**
F206					1			26	33	15	749																3				1				4					1		8		1	109				4			**955**
F207			1					3	45	15	309										1	1	3				2	2			1	1	7	4	4					3				14	201				200			**817**
F214	2			2	1			2	33	7	683				2			1			6	3	2				1	2		1		2	3	8	4	1			1	5	1	66		140	342				17	7		**1345**
F218	2			1	2			4	61	13	515										15	3	1		1		1	1		1			4	3	7	4			1		1		5		45	60				1			**752**
F220					1			13	41	39	471			1							21	2	1								1	1	3	6	5									29	149							**784**
F227										2	60																								1					2				2	5					60	**132**
F228					1				6	2	51										4		1					1					4		2							9		34	105							**220**
F229	1								23	10	379												1				1			2		1	4	1	4	4					2				12	245					83		**773**
F232	4								7	7	680				1	1					5		3				1			1			2	3	2	2							37		46	36				7			**845**
F237								9	31	3	329												1				3	1		1			4						1	2					1	8							**394**
F245	1		2						11	12	781									1	3		3				2				1		1	1	2	4					8		1	5	436	421				305	9		**2010**
F247								85	26	20	238										5		2				1			2			3	2	1	1									31	53							**470**
F248	3	2	1	1				1	128	17	1623				2						12	10	11				10	1			3	2	12	3	3	5	1				3				90	160				263			**2367**
F250								5	63	19	475										1		1		1			2				2	1	4	5	2				4		42	3	12	92				260			**994**
F251	1	1			1			5	45	24	1058	1									20	3	4		2		3			2	1	3	4	3					10		76		211	343				228			**2049**
F256								3	13	6	65										4	1										1	1	1	1									4	11							**111**
F257								77	87	42	381										5		1						2	1		1	3	3	1			1		1								224	103		**933**
Total	26	3	5	13	7	584	4	387	1096	351	14277	1		3	7	1		1		1	226	62	58	1	7	1	41	18	1	22	12	13	62	92	108	62	2	1	3	3	66	1	1352	8	1792	4307				3281	227	174	**28770**

APPENDIX IV: Inter-Site Analysis Data

Table 36: Inter-Site Analyses: Location Data

Site	Date	Region	Houses	SSLs	Max No. SSL/House	Houses with SSLs	Houses without SSLs	Frequency of Houses with SSLs	Average SSL to Living Space Area Ratio (%) (houses with SSLs only)	Range (%) per House
Alexandra	14th century	York	17	28	3	12	5	70.6	3.8	1.3-7.2
Antrex	13th to Early 14th	Peel	8	4	2	4	5	50.0	3.5	3.0-4.4
Baker	15th century	York	4	5	1	3	1	75.0	1.9	0.6-3.4
Dunsmore	15th century	Simcoe	16	23	6	10	6	62.5	4.5	2.3-26.7
Dykstra	14th century	Simcoe	1	2	1	1	0	100.0	4.4	4.4
Holly	13th to Early 14th	Simcoe	7	15	4	5	2	71.4	7.5	3.6-13.4
Hope	15th century	York	6	2	1	1	2	16.7	0.85	0.8-0.9
Hubbert	15th century	Simcoe	3	17	9	3	0	100.0	20.1	17.5-26.8
Myers Road	13th to Early 14th	Waterloo	10	18	6	6	4	60.0	2.6	0.8-5.7
New	14th century	York	6	5	2	3	3	50.0	2.2	2.1-2.2
Norton	15th century	London	9	1	1	0	9	0.0	n/a	n/a
Olmstead	13th to Early 14th	Hamilton	4	1	1	0	5	0.0	n/a	n/a
Orion	15th century	York	6	1	1	1	5	16.7	4.8	4.8
Praying Mantis	13th to Early 14th	London	3	1	1	1	2	33.3	1.8	1.8
Redeemer	14th century	Hamilton	9	36	13	9	9	100.0	10.5	1.9-21.8
Serena	14th century	Hamilton	6	3	2	2	4	33.3	3.2	2.2-4.0
Tilsonburg	14th century	Oxford	15	18	5	9	6	60.0	2.4	0.9-6.0
Wellington	13th to Early 14th	Simcoe	2	2	1	2	0	100.0	4.1	2.9-4.8

Table 37: Inter-Site Analyses: Alignment Data

Site	Date	Region	Houses	# of SSLs	Central Corridor	Bunk Line	Appended	External	Unknown
Alexandra	14th century	York	17	28	8	18	2	0	0
Antrex	13th to Early 14th	Peel	8	4	0	2	2	0	0
Baker	15th century	York	4	5	0	4	1	0	0
Dunsmore	15th century	Simcoe	16	23	2	14	7	0	0
Dykstra	14th century	Simcoe	1	2	1	0	0	1	0
Holly	13th to Early 14th	Simcoe	7	15	2	3	8	1	0
Hope	15th century	York	6	2	0	2	0	0	0
Hubbert	15th century	Simcoe	3	17	2	9	6	0	0
Myers Road	13th to Early 14th	Waterloo	10	18	3	10	5	0	0
New	14th century	York	6	5	0	4	1	0	0
Norton	15th century	London	9+	1	0	0	0	1	0
Olmstead	13th to Early 14th	Hamilton	4+	1	0	0	0	1	0
Orion	15th century	York	6	1	0	0	1	0	0
Praying Mantis	13th to Early 14th	London	3	1	0	0	1	0	0
Redeemer	14th century	Hamilton	9?	36	2	7	20	4	3
Serena	14th century	Hamilton	6	3	0	1	2	0	0
Tilsonburg	14th century	Oxford	15	18	0	9	8	1	0
Wellington	13th to Early 14th	Simcoe	2	2	0	0	3	0	0

Table 38: Inter-Site Analyses: Dimensional Attribute Data

Site	Date	Region	Houses	# of SSLs	Mean Length (cm)	Length Range (cm)	Mean Width (cm)	Width Range (cm)	Mean Depth (cm)	Depth Range (cm)
Alexandra	14th century	York	17	28	271.6	180-418	198.3	134-305	27.5	4-42
Antrex	13th to Early 14th	Peel	8	4	255.0	182-310	184.3	145-220	44.0	25-56
Baker	15th century	York	4	5	316.0	299-334	212.0	178-250	31.6	18-50
Dunsmore	15th century	Simcoe	15	23	303.1	150-449	171.4	91-254	47.7	26-70
Dykstra	14th century	Simcoe	1	2	315.0	310-320	217.5	215-220	44.5	43-46
Holly	13th to Early 14th	Simcoe	7	15	316.0	162-420	212.9	96-239	65.9	31-103
Hope	15th century	York	6	2	278.5	257-300	213.0	186-240	39	32-46
Hubbert	15th century	Simcoe	3	17	300.0	190-460	162.4	140-200	53.2	20-105
Myers Road	13th to Early 14th	Waterloo	10	18	297.6	220-350	168.6	120-261	41.7	15-62
New	14th century	York	6	5	328.4	205-493	181.6	148-234	38.0	32-42
Norton	15th century	London	9+	1	342.0	342.0	194.0	194.0	n/a	n/a
Olmstead	13th to Early 14th	Hamilton	4+	1	221.0	221.0	200.0	200.0	28.0	28.0
Orion	15th century	York	6	1	350.0	350.0	200.0	200.0	50.0	50.0
Praying Mantis	13th to Early 14th	London	3	1	282	282	185	185	28.0	28
Redeemer	14th century	Hamilton	9?	36	329.2	190-433	219.7	85-385	62.9	17-87
Serena	14th century	Hamilton	6	3	292.7	260-356	209.7	151-279	18.0	5-30
Tilsonburg	14th century	Oxford	15	18	330.1	160-475	217.9	107-344	43.1	12-78
Wellington	13th to Early 14th	Simcoe	2	2	310.3	266-370	184.0	160-205	69.0	47-88

Table 39: Inter-Site Analyses: Dimensional Attribute Raw Data

SSL F#	House	Length (cm)	Width (cm)	Depth (cm)	Area (m2)
		Alexandra			
97	1	318	140	29	4.58
98	1	244	140	24	3.59
44	2	271	182	19	4.65
67	2	264	200	25	5.11
70	2	260	200	12	5.03
56	3	180	170	22	3.95
58	3	374	305	30	10.18
63	3	287	181	35	5.22
115	5	305	200	17	5.43
124	5	245	230	43	4.51
138	5	230	220	41	5.56
192	6	230	220	46	3.52
198	6	275	158	31	4.16
157	7	190	138	37	2.14
168	7	320	265	52	5.42
181	7	337	187	28	5.08
293	9	220	194	20	3.71
246	10	193	167	24	2.33
250	10	258	200	35	4.22
299	12	182	175	18	3.07
301	12	222	179	4	2.98
306	13	272	239	40	4.27
319	13	418	291	25	5.85
332	14	315	141	17	5.27
335	14	289	174	25	5.55
336	14	390	285	26	6.89
345	17	320	236	20	7.20
346	17	196	134	24	3.70
		Antrex			
30	4	225	155	50	3.9
58	4	182	145	25	2.56
93	6	310	220	56	6.02
143	9	303	217	45	4.95
		Baker			
107	1	327	202	50	4.42
153	2	320	250	25	6.6
201	2	302	178	38	4.15
286	4	299	206	27	4.5
325	4	334	224	18	4.86
		Dunsmore			
70	1	300	168	47	4.21
74	1	208	168	64	3.07
109	1	382	254	52	6.13
125	1	209	185	40	2.8
126	1	414	248	60	6.77
129	1	278	210	66	3.72
238	7	350	214	43	3.61
347	7	401	161	55	3.86
354	7	284	222	70	3.51
386	7	360	154	35	3.35
322	9	332	124	27	2.9
465	13	449	193	48	5.69
574	15	296	172	26	4.27
220	8	293	151	36	3.54
222	8	280	180	34	2.7
230	8	264	122	36	2.62
411	10	287	166	65	3.51
412	10	272	171	50	3.03
425	11	150	91		2.72
437	11	289	131	42	2.86
537	14	236	175	54	2.77
204	12	260	110	32	1.78
208	12	310	175	67	2.77
		Dykstra			
87	EA02	310	220	46	5.03
14	1	320	215	43	4.39
		Holly			
26	1	345	219	70	5.81
31	1	420	200	103	6.18
227	2	330	293	46	6.16
459	2	367	198	65	5.36
376	2	380	240	96	7.31
340	2	350	207	70	4.41
573	3	162	96	35	3.21
674	4	378	220	75	6.58
716	4	341	253	78	6.05
751	4	320	190	64	4.44
775	4	240	180	31	6.17
806	4	260	275	75	5.35
855	4	275	200	50	4.13
2001/2007	7	290	255	70	8.93
2010	EA04	282	168	61	4.99
		Hope			
112	5	257	186	46	2.75
258	3	300	240	32	4.99
		Hubbert			
99	1	360	160	52	5.16
98	1	300	170	63	5.05
92	1	260	160	36	4.33
147	1	280	140	58	4.76
167	1	290	160	23	5.65
73	1	460	170	105	7.86
12	1	350	170	77	7.66
135	1	270	160	26	3.99
136	1	250	140	44	5.23
197	2	320	150	66	5.91
199	2	310	170	58	5.8

SSL F#	House	Length (cm)	Width (cm)	Depth (cm)	Area (m2)
219	2	260	160	66	4.11
232	2	190	160	20	4.76
233	2	320	160	44	6.17
201	2	330	150	50	5.61
226	3	310	200	67	7.06
246	3	240	180	49	5.05
		Myers Road			
411	1	294	165	40	4.55
176	1	336	194	42	5.68
91	1	335	238	39	6.69
88	1	272	160	23	4.92
366	1	230	132	40	3.68
191	1	285	162	54	4.68
237	2	350	160	22	3.48
246	3	293	145	62	3.14
162	3	280	185	42	4.29
92	3	310	197	53	4.71
133	3	290	170	43	3.6
220	3	282	184	59	4.08
310	4	220	120	15	1.65
311	4	317	145	40	3.4
339	7	342	136	42	3.66
332	7	328	261	44	5.27
500	9	268	130	46	3.16
501	9	325	150	45	2.07
		New			
23	1	374	161	39	4.21
30	1	300	235	42	5.35
97	4	205	148	39	4.48
108	4	270	175	32	4.05
OT 1977	6	493	189	ND	3.44
		Norton			
ND	EX	3.42	1.94	ND	1
		Olmstead			
11	?	221	200	28	3.37
		Orion			
20	1	350	200	50	4.8
		Praying Mantis			
n/a	2	282	185	28	3.42
		Serena			
210	4	262	151	19	3.51
221	4	356	278	5	7.14
230	5	260	200	30	4.47
		Tillsonburg			
242	4	413	220	78	7.66
243	4	290	155	12	2.8
63	5	160	107	28	1.64
226	5	300	179	30	2.96
255	5	220	160	56	2.01
282	6	280	270	67	5.57
316	7	300	240	24	5.08
383	7	332	171	38	3.99
384	7	424	344	62	9.27
512	8	252	220	22	6.44
540	9	284	226	18	4.76
1226	13	420	200	37	8.81
1513	14	475	250	75	7.26
1877	14	340	196	28	4.21
1564	14	350	280	45	4.91
1595	14	325	225	60	3.71
1725	14	390	200	50	4.09
2012	15	440	280	45	7.42
		Wellington			
10	1	370	187	72	5.44
32	1	295	205	88	6.33
52/94	2	266	160	47	4.16

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